US Army Corps of Engineers®
Engineer Research and
Development Center

Micro ROOFER for Windows User Guide
Version 2.0

David M. Bailey   August 2003

20031001 245

ABSTRACT: ROOFER is an engineered management system (EMS) designed to provide organizational facilities for the management of bituminous built-up, single-ply and asphalt shingle roofing systems. Micro ROOFER, the software embodiment of ROOFER EMS, was a fielded product that operated on PC compatible computers running MS-DOS.

Micro ROOFER was developed by the U.S. Army Engineer Research and Development Center, Construction Engineering Research Laboratory (ERDC/CERL) as a computer version of ROOFER EMS. The program provides engineers with data and procedures to aid in practical decision making for cost-effective maintenance and repair of building roofs. The program was modified to include management of the steep roofing systems inventory and the condition assessment of asphalt shingle roofs.

Micro ROOFER For Windows™ provides the user with many important capabilities, including: data storage and retrieval; database administration; ease of use and functionality; determination of membrane, flashing, insulation, and overall roof condition ratings; determination of optimal maintenance, repair, and replacement strategies; report generation for network and project level management.

The objective of this report is to provide operating instructions to users of the Micro ROOFER for Windows software database program.

Contents

Report Documentation Page

Conversion Factors

Non-SI units of measurement used in this report can be converted to SI units as follows:

Multiply	By	To Obtain
acres	4,046.873	square meters
cubic feet	0.02831685	cubic meters
cubic inches	0.00001638706	cubic meters
degrees (angle)	0.01745329	radians
degrees Fahrenheit	(5/9) x (°F – 32)	degrees Celsius
degrees Fahrenheit	(5/9) x (°F – 32) + 273.15.	kelvins
feet	0.3048	meters
gallons (U.S. liquid)	0.003785412	cubic meters
horsepower (550 ft-lb force per second)	745.6999	watts
inches	0.0254	meters
kips per square foot	47.88026	kilopascals
kips per square inch	6.894757	megapascals
miles (U.S. statute)	1.609347	kilometers
pounds (force)	4.448222	newtons
pounds (force) per square inch	0.006894757	megapascals
pounds (mass)	0.4535924	kilograms
square feet	0.09290304	square meters
square miles	2,589,998	square meters
tons (force)	8,896.443	newtons
tons (2,000 pounds, mass)	907.1847	kilograms
yards	0.9144	meters

Preface

This task was originally executed for the U.S. Army Installation Support Center under Military Interdepartmental Purchase Request (MIPR) W26HBF82653391, "Micro ROOFER Program for Asphalt Shingle Roofs," dated 30 September 1998. This document reflects later updates to the Micro ROOFER software program and editorial enhancements of the original text. The technical monitor at Headquarters, U.S. Army Corps of Engineers was David C. Bohl, CEMP-IS.

The work was performed by the Materials and Structures Branch (CF-M) of the Facilities Division (CF), Construction Engineering Research Laboratory (CERL). The CERL Principal Investigator was David M. Bailey. Potomac Research International, Inc., provided assistance with software development and revisions to the user guide under contract DACA88-99-M-0053. The technical editor was Vicki A. Reinhart, Information Technology Laboratory – Champaign. Martin J. Savoie is Chief, CEERD-CF-M, and L. Michael Golish is Chief, CEERD-CF. The Technical Director of the Installation Operations business area is Gary W. Schanche, CEERD-CV-ZT, and the Director of CERL is Dr. Alan W. Moore.

CERL is an element of the U.S. Army Engineer Research and Development Center (ERDC), U.S. Army Corps of Engineers. The Commander and Executive Director of ERDC is COL John Morris III, EN and the Director is Dr. James R. Houston.

1 Introduction

Background

ROOFER is an engineered management system (EMS) designed to provide organizational facilities for the management of bituminous built-up, single-ply and asphalt shingle roofing systems. Micro ROOFER, the software embodiment of ROOFER EMS, was a fielded product that operated on desktop computers running the Microsoft MS-DOS operating system.[*] During the period of 1991 through 1995, Micro ROOFER proved to be a valuable tool for management of roofing repairs and maintenance.

After the release of the Microsoft Windows™ version, the Micro ROOFER for Windows product was developed to offer several enhancements to the data entry, reporting, and overall performance of Micro ROOFER. The program was modified to include management of the steep roofing systems inventory and the condition assessment of asphalt shingle roofs.

It is assumed that the user is familiar with the data collection procedures of the ROOFER system. For more information on ROOFER, refer to Shahin, Bailey, and Brotherson (1987, vol I and II)[†]; Bailey et al. (1989) [‡]; Bailey et al. (1993) [§]; and Bailey (1999)[**].

---

[*] Microsoft, MS-DOS, and Windows are trademarks of Microsoft Corp., Redmond, WA.

[†] Mohamed Y. Shahin, David M. Bailey, and Donald E. Brotherson. *Volume I: Membrane and Flashing Condition Indexes for Built-Up Roofs* and *Volume II: Inspection and Distress Manual,* Technical Report M-87/ADA190368 (U.S. Army Construction and Engineering Research Laboratory [USACERL], September 1987).

[‡] David M. Bailey, Donald E. Brotherson, Wayne Tobiasson, and Al Knehans. *ROOFER: An Engineered Management System for Bituminous Built-Up Roofs,* Technical Report M-90/04/ADA218529 (USACERL, December 1989).

[§] David M. Bailey, Donald E. Brotherson, Wayne Tobiasson, Stuart D. Foltz, and Al Knehans. *ROOFER: Membrane and Flashing Condition Indexes for Single-Ply Membrane Roofs Inspection & Distress Manual,* Technical Report FM-93/11/ADA272573 (USACERL, April 1993).

[**] David M. Bailey, *ROOFER: Steep Roofing Inspection Procedures and Inspection and Distress Manual for Asphalt Shingle Roofs,* Technical Report 99/100 (USACERL, December 1999).

Micro ROOFER was developed by the U.S. Army Engineer Research and Development Center, Construction Engineering Research Laboratory (ERDC/CERL) as a computer version of ROOFER Engineered Management System. The program provides engineers with data and procedures to aid in practical decision making for cost-effective maintenance and repair of building roofs.

Micro ROOFER For Windows provides the user with many important capabilities, including:

- data storage and retrieval
- database administration
- ease of use and functionality
- determination of membrane, flashing, insulation, and overall roof condition ratings
- determination of optimal maintenance, repair, and replacement strategies
- report generation for network and project level management.

Objectives

The objective of this report is to provide operating instructions to users of the Micro ROOFER for Windows software database program.

Mode of Technology Transfer

Micro ROOFER is available to military users by contacting David M. Bailey, ROOFER Principal Investigator, at the U.S. Army Engineer Research and Development Center, Construction Engineering Research Laboratory, 217-352-6511, ext 7480; or via Internet email sent to david.m.bailey@erdc.usace.army.mil. For nonmilitary users, Micro ROOFER software, documentation, and support is available through the ROOFER Technical Assistance Center at the University of Illinois at Urbana-Champaign, 217-333-5414; or online at http://www.conted.uiuc.edu/techctr/.

Notice to Program Recipients

The *Micro ROOFER For Windows* program is furnished by the United States Government and is accepted and used by the recipient with the express understanding that the Government makes no warranty, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose

of the information and data contained in this program or furnished in connection therewith, and the United States shall be under no liability whatsoever to any person by reason of any use made thereof.

The program belongs to the Government. Therefore, the recipient further agrees not to assert any proprietary rights therein or to represent this program to anyone as other than a Government program. The recipient also agrees that the program and all documents related thereto, including all copies and versions (except when expressly authorized otherwise) in possession thereof, will be discontinued from use or destroyed upon request by the Government.

This program is to be used only in the public interest and/or the advancement of science and will not be used by the recipient to gain unfair advantage over any client or competitor. Whereas the recipient further agrees not to levy a charge, royalty, or proprietary usage fee (expect to cover any normal copying and/or distribution costs) upon any client for the development or use of the received program. Recipients deciding to modify and re-market the program will be required to comply with a separate agreement.

Only minor or temporary modifications will be made to program (e.g., necessary corrections or changes in the format of input or output) without written approval from the Government. Should the program be furnished by the recipient to a third party, the recipient is responsible to that third party for any support and upkeep of the program. Information on the source of the program will be furnished to anyone requesting such information.

The accuracy of this program depends entirely on user-supplied data. It is the user's responsibility to understand how the input data affects the program output and to use the output data only as intended.

All documents and reports conveying information obtained as a result of the use of this program by the recipient will acknowledge the Corps of Engineers, Department of the Army, as the origin of the program. All such documentation will state the name and version of the program used by the recipient.

The user of this manual should note that, throughout the document, the names of identifiable installations and facilities displayed on software screen shots have been visually obscured for security purposes.

2 Installation

Hardware Requirements

NOTE: The following hardware and software components are required to use Micro ROOFER For Windows.

Minimum Hardware Platform
Intel equivalent 80486DX 50 or newer
8 Megabytes RAM
10 megabytes of free space on hard disk

Minimum Software Platform
Microsoft Windows 3.1 or higher

Installation Procedure

Micro ROOFER for Windows operates much like any other windows-based software module. **Micro ROOFER for Windows** features can be easily accessed through the use of pull-down menus and pop-up buttons.

To install the **Micro ROOFER for Windows** product:

1. Insert the installation media into the appropriate drive or reader.

2. If using Windows 95/98, select **Run** from the **Start** menu. For Windows 3.1, select **Run** from **File** menu in **Program Manager**.

3. Type "A:\Setup" in the **Open** field. (**Command Line** for Windows 3.1 users)

4. Follow the setup instructions presented to complete the installation process.

5. To print reports, be sure that a default printer has been installed and selected.

3 Navigation

Accessing Micro ROOFER for Windows

After the installation script is run, the user will see a program group in **Program Manager** or the **Start Menu** called "Micro ROOFER for Windows". The ROOFER program group includes icons for the major ROOFER components. To start Micro ROOFER For Windows, double-click the icon in a program group or folder.

What's on the Micro ROOFER for Windows Screen?

The following menu window will be displayed when Micro ROOFER for Windows is started.
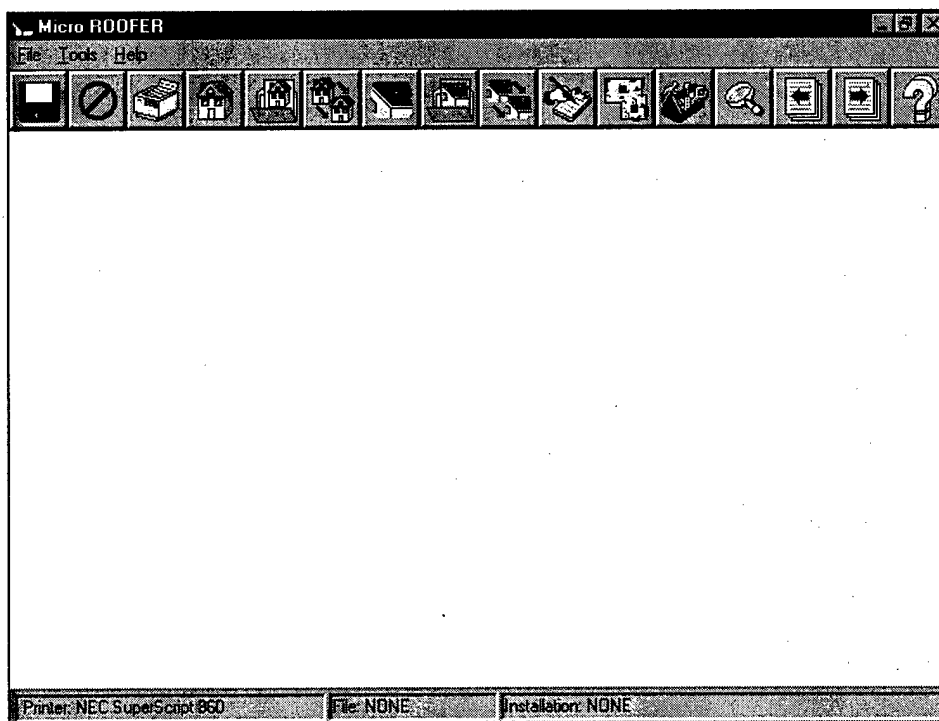
NOTE: *Throughout this manual, the names of identifiable installations and facilities displayed on screen shots have been visually obscured for security purposes.*

Using the Mouse

This section gives basic information about using the mouse and describes the mouse pointer shapes.

The following table explains the basic terms associated with mouse use.

Function	Description
Point	Position the pointer on an item
Click	Point to an item, and then quickly press and release the mouse button.
Double-Click	Point to an item, and then quickly press and release the mouse button twice.
Drag	Point to an item. Press and hold the mouse button as you move the mouse to a new location. Then, release the mouse button.

NOTE: For additional information regarding the use of a mouse within Windows, refer to the Windows manual.

Choosing Commands within Micro ROOFER for Windows

A command is an instruction that initiates a Micro ROOFER for Windows action.
To choose a command:
- click a toolbar button with the mouse
- choose a command from the menu
- use a shortcut key.

Micro ROOFER for Windows includes toolbars to perform common tasks quickly.
For example, to open **New Building**, just click on the standard toolbar.
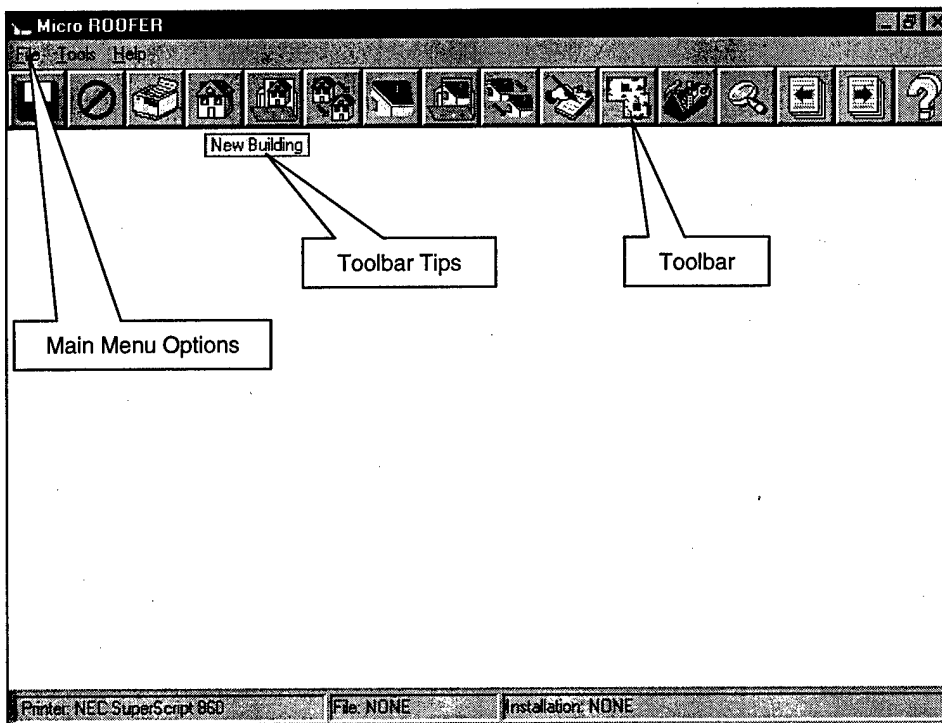
The overall style of the screens used in Micro ROOFER for Windows closely follows
the standard Windows guidelines. This includes the use of standard shortcut keys
to common menu items, command buttons, and conformance to the Multiple Document
Interface (MDI) standard.

The Micro ROOFER for Windows screen design uses both text and controls, has the
"steel" texture and "3-D" appearance, and uses "tabbed" controls where appropriate.
The data-entry screens have been designed to be user-friendly.

Using Dialog Boxes

After choosing a command, a dialog box often appears to allow options to be se-
lected. If an option is dimmed, it is not currently available.

Some dialog boxes provide sets of options, each on a separate tab. For example, the
General Roof Section Inventory box has seven tabs: General, Structure, Insulation,
Membrane, Flashing, Remarks, and Picture.
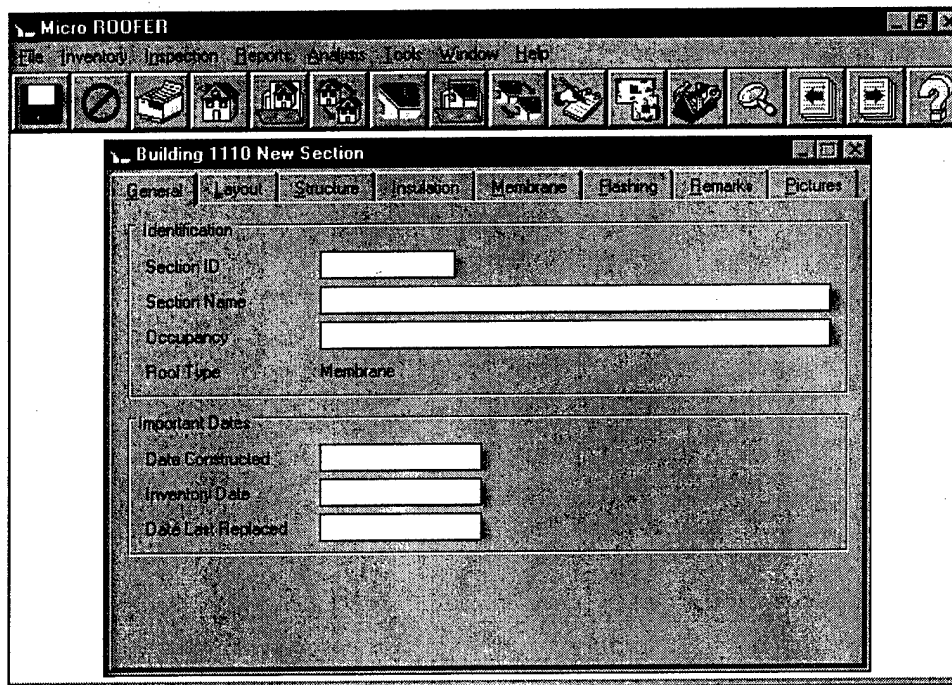
Using On-Line Help

To access the ROOFER on-line help screens, highlight **Help** from the toolbar and click on **Contents**.
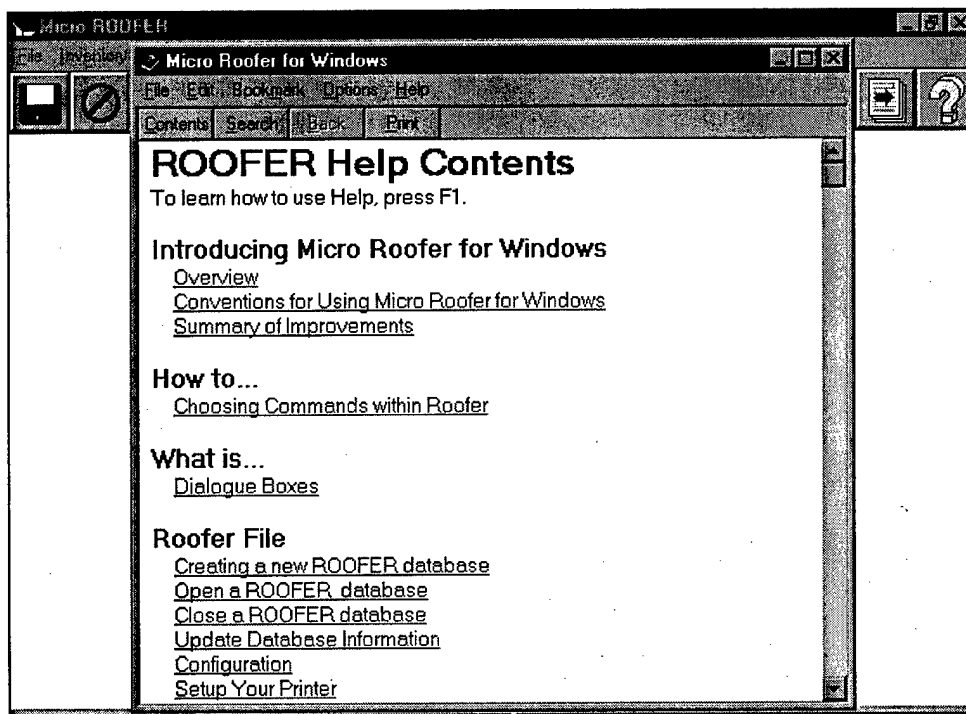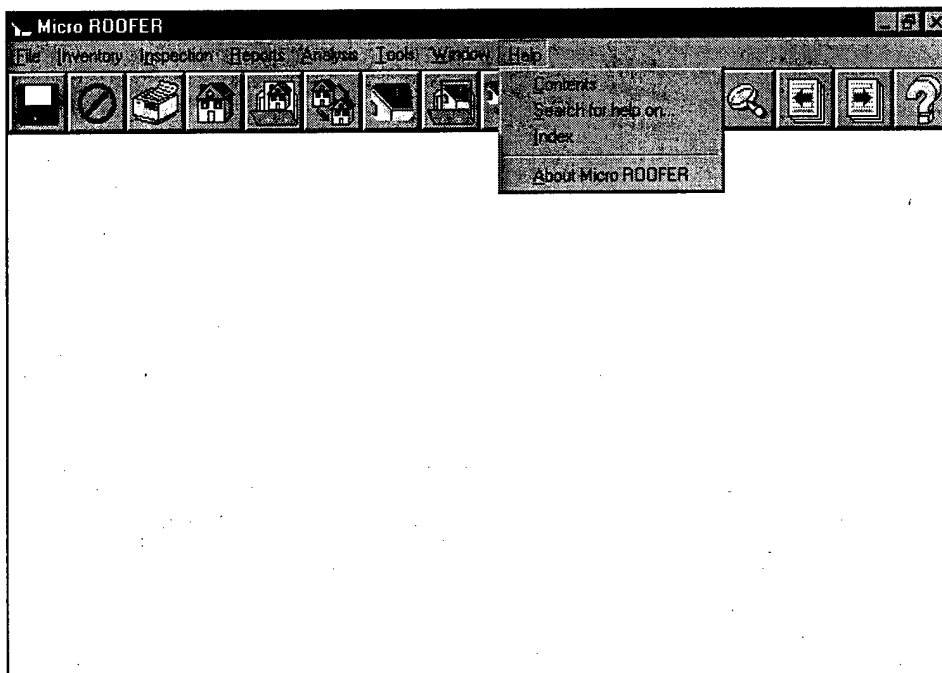
Using On-Line Help (Cont.)

For additional information about using Micro ROOFER for Windows, select any of the menu items within the help screen.

Open a Roofer Database

In the event that you desire to open an existing Roofer database, you will need to choose the **OPEN DATABASE** item from the Roofer **FILE** Menu. If a password has been defined for this database when it was first created, you will be requested to enter a correct password in the Password dialog box in able to open the database. After you enter the correct password, FDD dialog box shows on the screen which allows you to select a Roofer Database file you wish to open. Once you have opened a database, its name and installation information appear at the bottom of the status bar. The additional menu items that will show on the menu bar include: **INVENTORY, INSPECTION, REPORTS, ANALYSIS,** and **WINDOW** which allow the user to perform the operation based on the opened database.

Another method to access the Micro ROOFER for Windows on-line help screen is through the use of the "**?**" menu selection item:
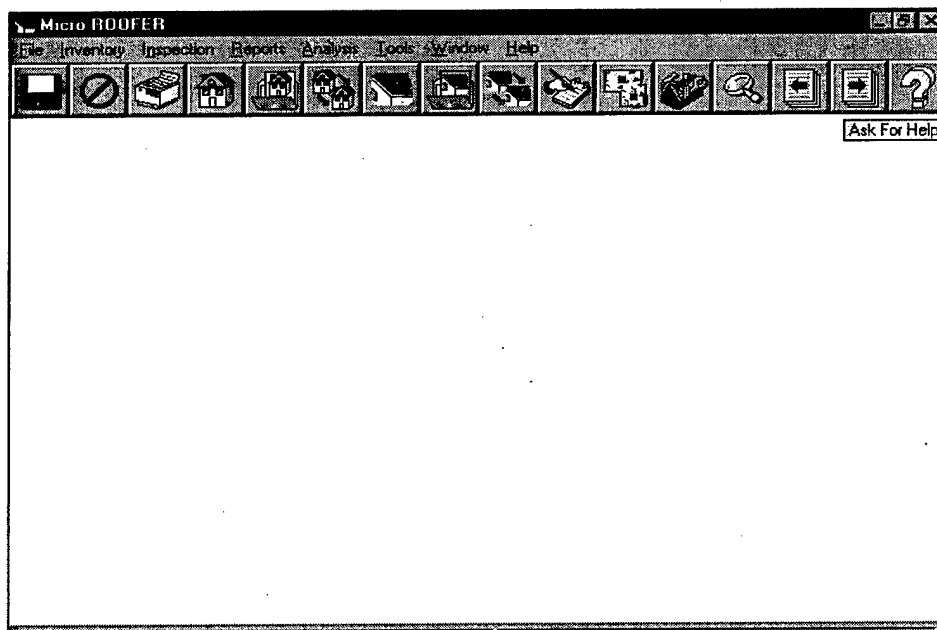
Creating a Database

To create a new Micro ROOFER for Windows database, the **File** menu bar must be highlighted. Under this pull-down menu click the **New** selection item as shown:
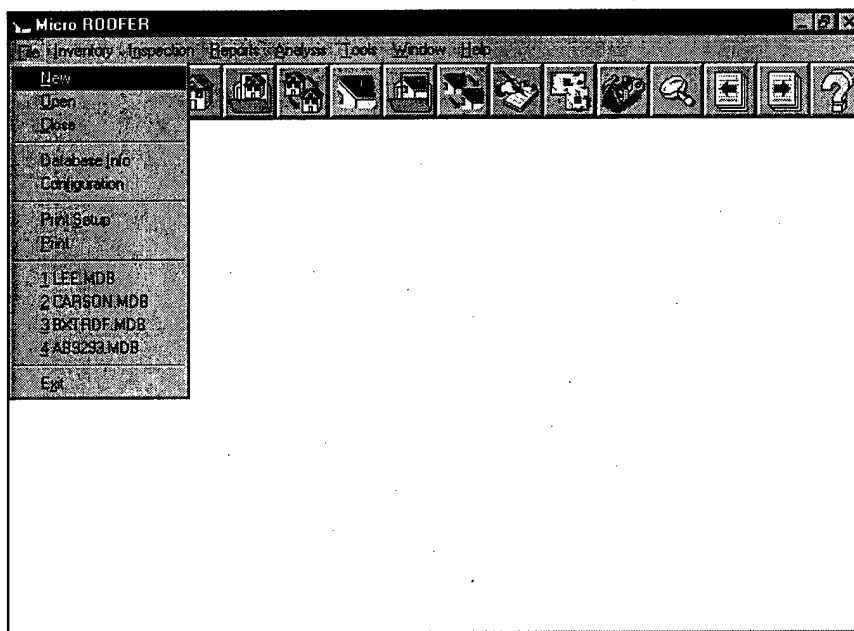
Next, enter the name of the database to be created (e.g., testname.mdb).

NOTE: The extension of this file must be .mdb.
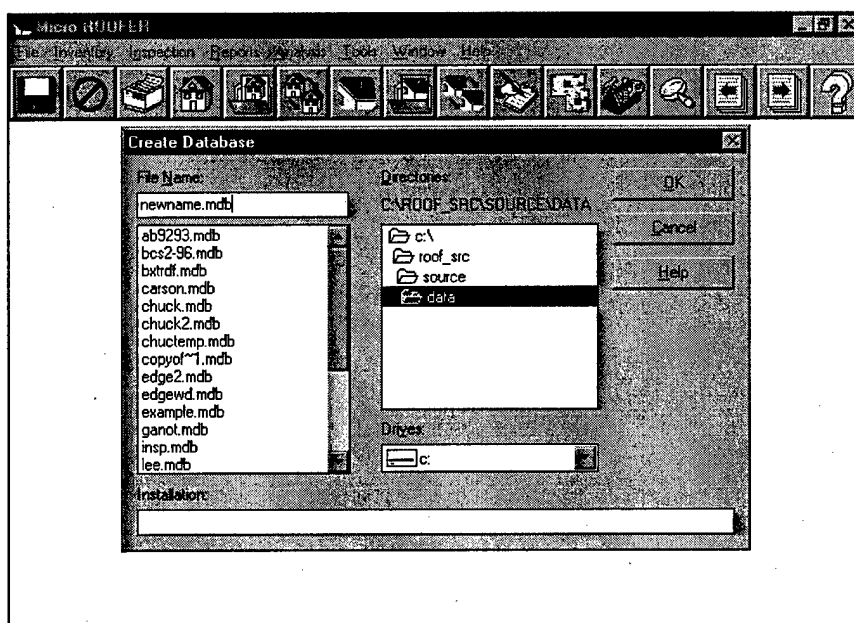
Creating a Database (Cont.)

The user is next prompted to enter general information about the Micro ROOFER
for Windows database to be created:
- Installation ID - installation number
- Installation Name - installation name
- Agency - agency name
- Point of Contact information (e.g., name, address, phone number)
- Password for database security (optional)

NOTE: If no password is selected during database creation, that particular data-
base will be available without password protection.

Creating a Database (Cont.)

Defining a Database Password

If a password is selected during the creation of a database, the following menu will appear each time a user attempts to open that database. Otherwise, the database will be available without the use of a password.
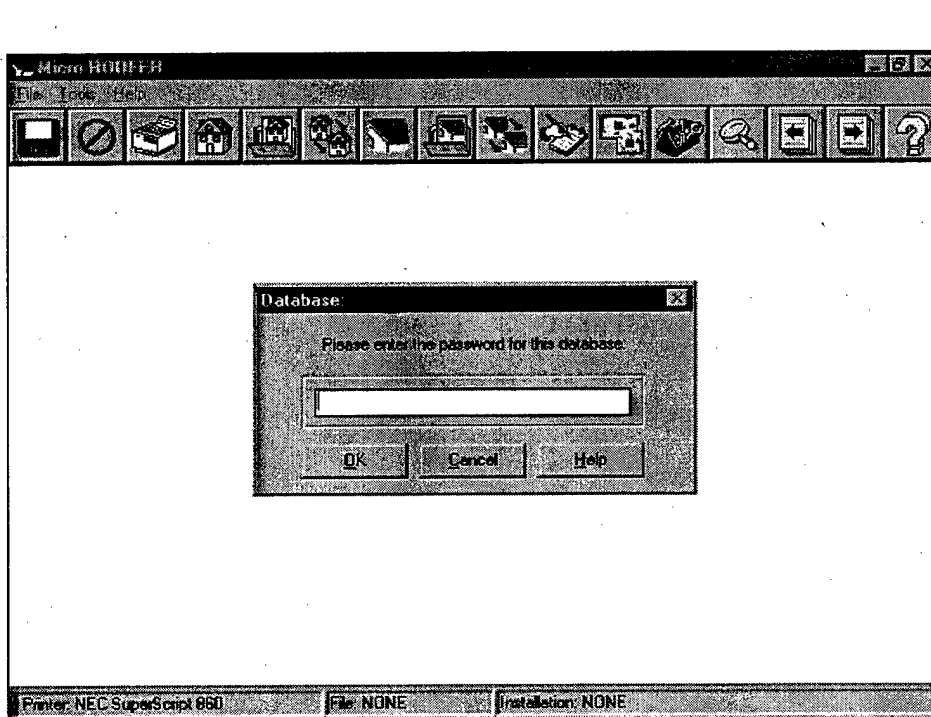
Subsequent access into Micro ROOFER for Windows databases with password security enabled will also require the password.

Print Setup

The **Print Setup** menu option allows the user to select a printer for output. A list of all printers defined on your computer are accessible under the printer list. The font, margins, and page orientation can also be changed through this dialog box.

NOTE: A printer must be selected to run reports.
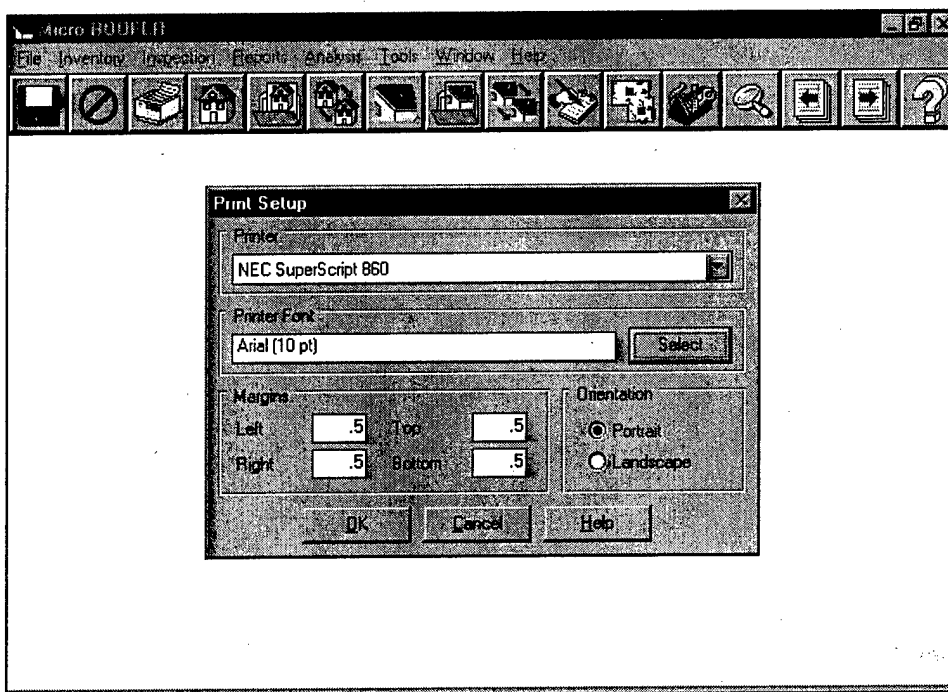
4 Data Entry/Modification

Introduction

The procedures for entering and modifying data into a Micro ROOFER for Windows database include:
- Database Information
- Building Identification
- Roof Section Identification
- Visual Inspection
- Insulation Inspection
- Database Information
- Work History.

NOTE: A database must be created prior to entering any information. Refer to the previous chapter for instructions on creating a new Micro ROOFER for Windows database.

Database Information

Each Micro ROOFER for Windows database file can contain only one Agency /Installation number.

The site information may be edited using the **Database Info** menu option. This option is the fourth option under the **File** pull-down bar.
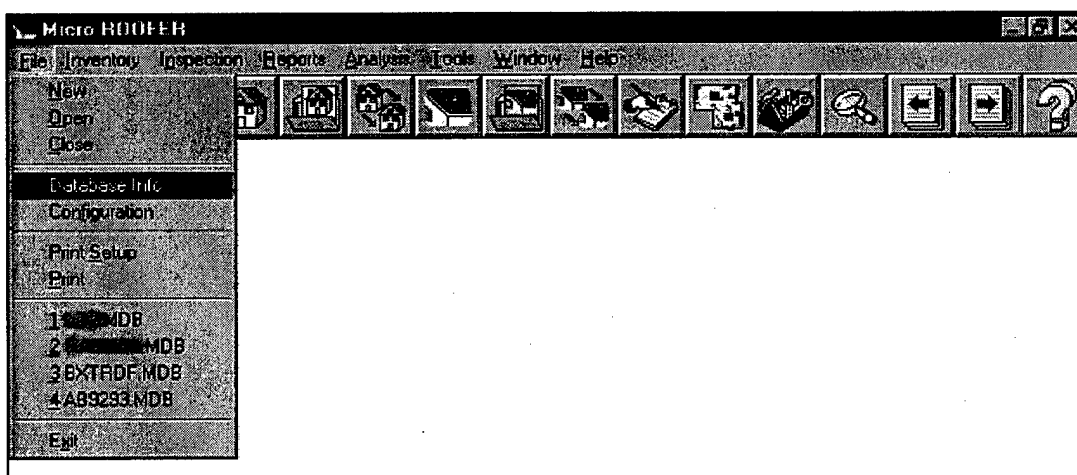
Database Information (Cont.)

General Information

Installation ID – enter the installation ID

Installation Name – enter the installation name

Agency Name – enter the name of the agency

Date Created on – enter the date the database was created

Date Updated on – enter the date the database was updated

Point of Contact Information

Name - Point of Contact (POC) name

Address, City, State, Zip – enter POC address information

Phone – enter POC phone number

Database Password – enter password assigned for database access (if needed)

Building Identification

The Building Identification record contains all pertinent building data. The Building Identification data must be entered *before* any Roof Section Identification data, Visual Inspection data, and Insulation Inspection data can be defined.

Select the **Inventory** option from the main file menu, then **Building** and **New** or **Update** options. In either case, be ready to specify key information such as the building name and number.

For new buildings being entered, enter the building ID, name and other relevant building information:

Building Identification (Cont.)

Building ID – enter the number of the building

Building Name – enter the name of the building

Inventory Date – enter the date the building inventory record was entered into the computer system

Category Code - An integer field of five numbers that indicates the design use of the building. For Army installations, this should be the category code assigned to the building as described by Army Regulation (AR) 415-28. For other agencies, the category code should be assigned using the following table:

Building Use	Category Code
Operational Training	10000
Maintenance and Production	20000
Research, Development, and Test	30000
Supply	40000
Hospital and Medical	50000
Administrative	60000
Housing and Community	70000
Utilities and Grounds	80000
Real Estate	90000

Building Identification (Cont.)

Facility Type – enter the type of building construction. Valid values are: Permanent, Semi-Permanent, Temporary, and Leased.

Facility Number - facility number of the building that is usually identical to the building number (e.g., 12400). An alphanumeric field allowing up to five characters.

Location - address of the building. An alphanumeric field allowing up to 40 characters.

Use - building occupancy or function (e.g., Logistics Center). An alphanumeric code allowing up to 40 characters.

Year Built – enter the year the building was originally constructed. An integer field allowing a maximum of 4 characters.

Remarks - For each building it is possible to enter remarks. Only four lines of remarks will be displayed at a time.

To edit or update ROOFER Building Inventory information, click **Inventory**, click **Building**, and then **Update**.
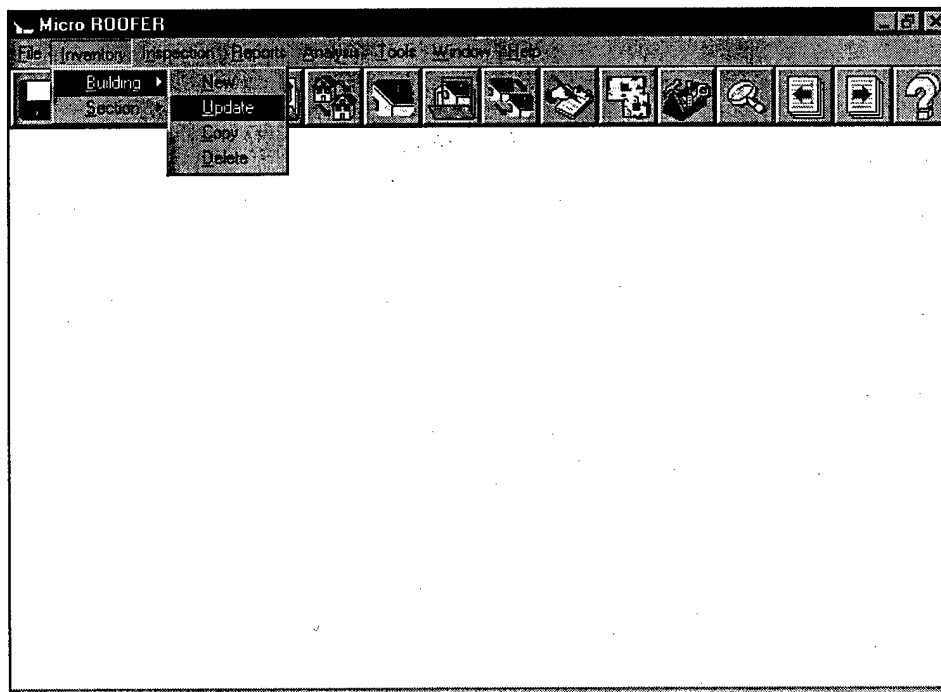
Building Identification (Cont.)

The Select Building screen will appear next. Click either **Sort by ID** or **Sort by Name**, click the appropriate ID or name, and then <**OK**>.
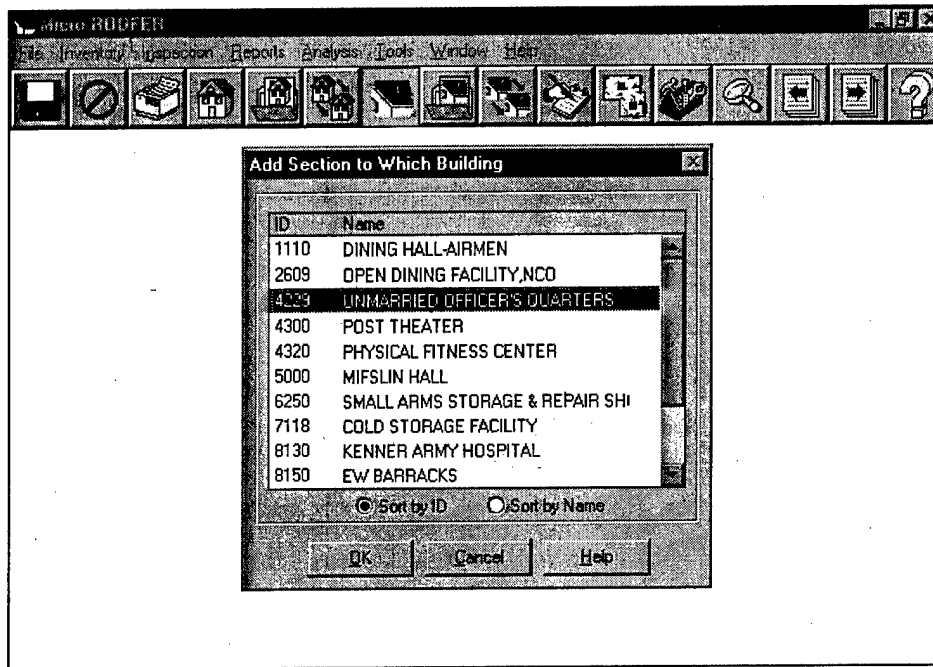
Any edit changes or additions to Building Information may be entered.
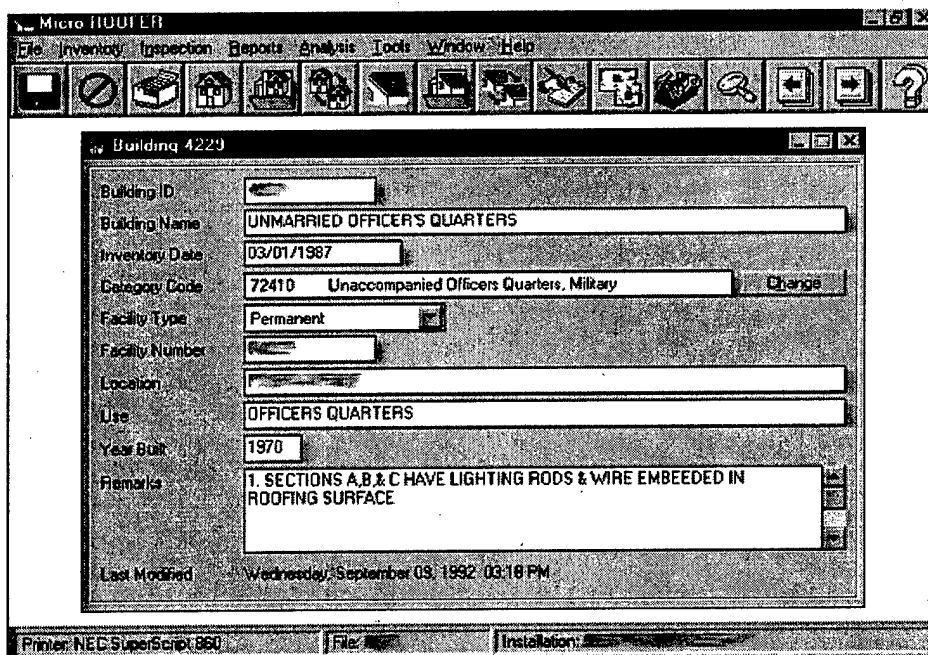
Building Identification (Cont.)

To save changes to the building information, choose the **<Yes>** button after closing the window. Otherwise, to cancel changes, select the **<No>** button.
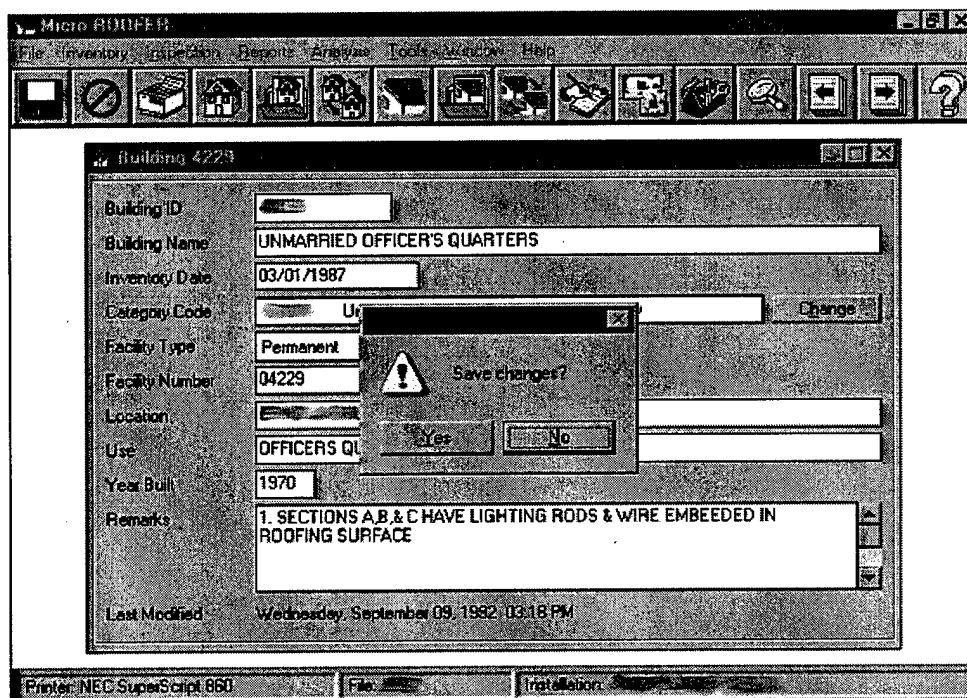
Roof Section Identification

The Roof Section Identification record stores pertinent information about a roof section. The Roof Section Identification must be entered before any inspection data or work history data can be entered. Select the **Inventory** option from the main **File** menu and then the cascading **Section** and **New** option.
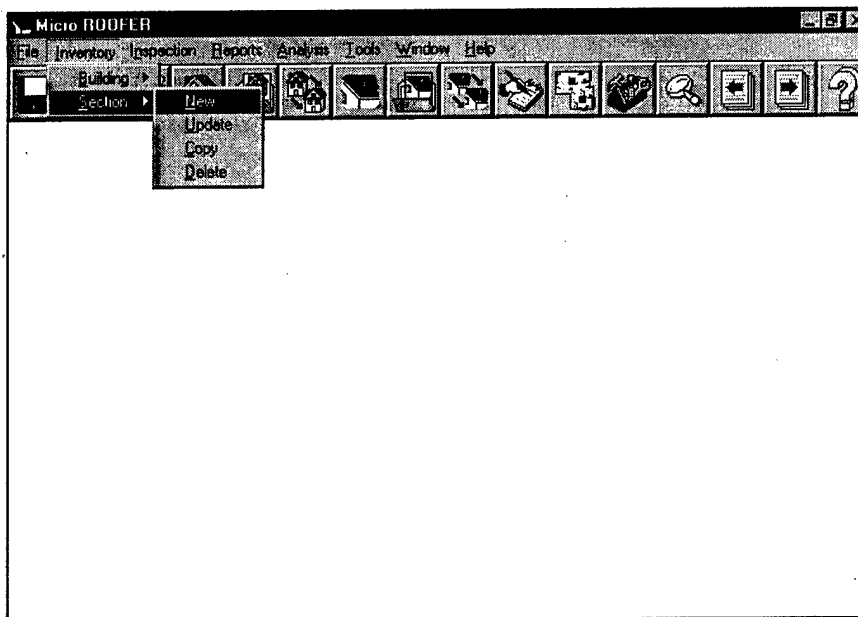
Next, specify the building associated with the roof section.
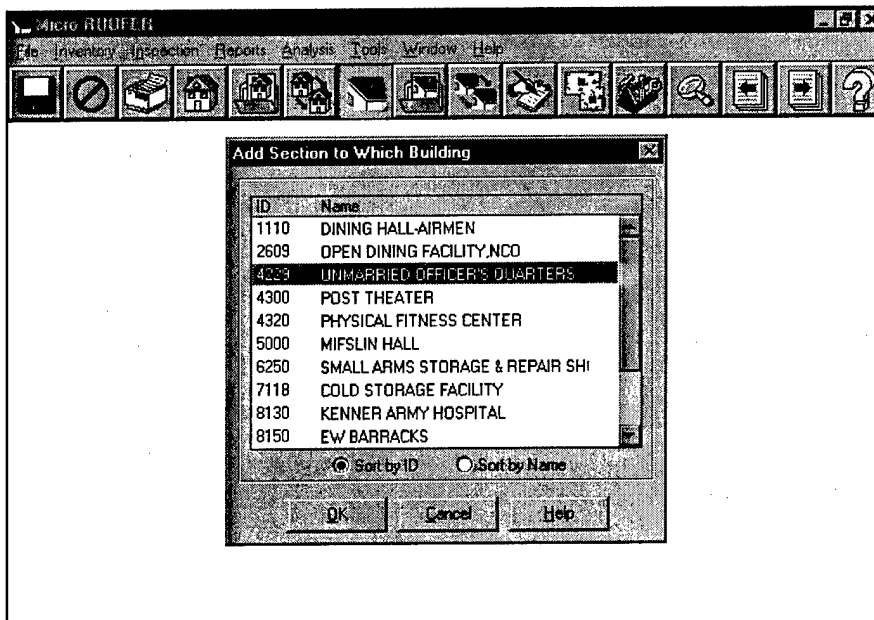
Roof Section Identification (Cont.)

When creating a new roof section, specify what type of section it is. ROOFER supports two types, "Membrane Roof" and "Steep Roof". This screen will allow you to select a type.
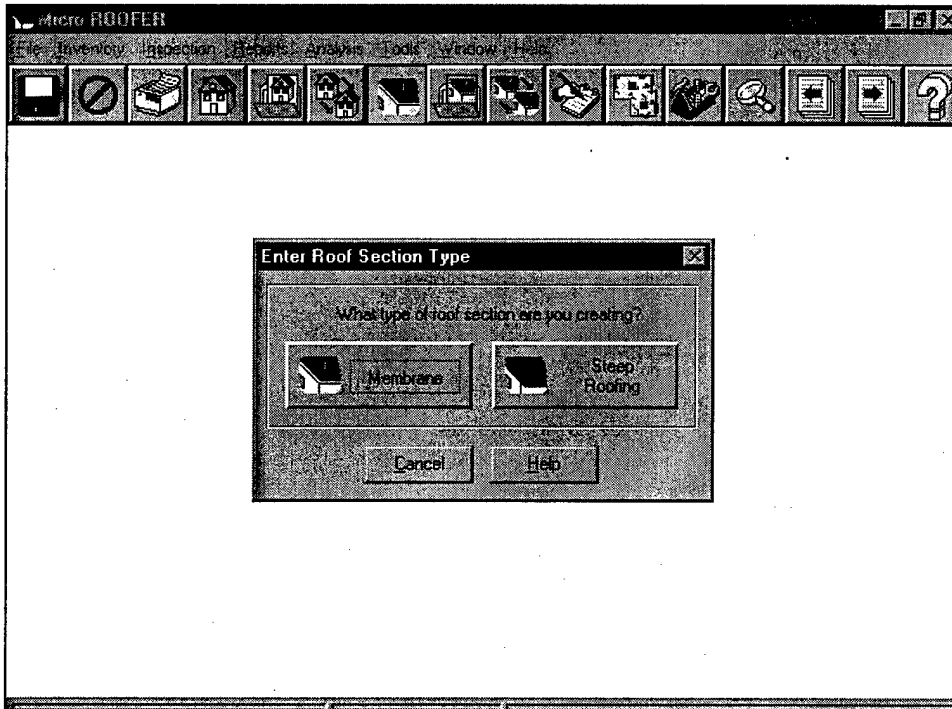
The following two sections will describe the two types of inventory screens.

Roof Section Identification - Membrane

General Information

Section ID – enter the section identifier

Section Name – enter the section name

Occupancy – enter the function under the roof section. Different roof sections of a building may have several different occupancies under them (e.g., computer room).

Date Constructed – enter the date the roof section was constructed. The date for the roof construction must be later than or equal to the date the building's original construction using the MM/DD/YYYY format.

Inventory Date – enter the date the inventory was performed.

Date Last Replaced – enter the date the roof membrane was replaced in the MM/DD/YYYY format. The date of the roof replacement must be later than or equal to the date of the building's original construction.

Roof Section Identification - Membrane (Cont.)

Roof Layout

Roof Area – enter the square footage of the roof area.

Roof Access – enter the method used to gain access to the roof.

Perimeter – enter the length, in feet, of the perimeter of the roof section. This is categorized into Parapet, Roof Edge, Expansion Joint, Area Divider, Adjacent Wall and Other.

Adjacent Sections - If roof access is from an adjacent roof section, enter the neighboring roof section. This field should only be used if the Roof Access value is defined as Adjacent Section.

Roof Section Identification - Membrane (Cont.)

Structure and Drainage Information

Structural Frame Type – enter the structural framing type of the roof section.

Roof Deck Type – enter the structural element type that supports the insulation and membrane of the roof section.

Roof Slope – enter the pitch of the roof section.

Drainage Types – enter the method type(s) of removing rainfall from the roof section. Up to seven drainage types may be entered but the menu window will only display four selections at one time.

Vapor Retarder Type – enter the type of vapor retarder used in the roofing assembly of the roof section.

Roof Section Identification - Membrane (Cont.)

Insulation Information

Insulation Type(s) – enter the type(s) of insulation used in the roof section. Only four insulation types will appear on this window at one time, however, more than four types of insulation may be selected.

Board Stock – enter the board thickness, number of layers and whether or not the board is tapered.

Insulating Fills and Foamed-in-Place – enter the insulation fills thickness and whether or not insulation fill is tapered.

Total R-Value – enter the total R-value of the insulation in the roof section. An integer value allowing a maximum of 2 digits.

Attachment – enter the type of attachment of the roof section insulation.

Roof Section Identification - Membrane (Cont.)

Membrane Information

Membrane Manufacturer – enter the company that manufactured the membrane for the roof section. If the membrane manufacturer is undetermined, enter "Unknown".

Membrane Spec. No. – enter the manufacturer's specification number for the membrane. If the specification number is undetermined, enter "Unknown".

Description – enter a brief description of the roof section membrane (e.g., number of plies and ply thickness).

Protected – enter a Yes or No response indicating if the roofing system is a protected membrane system.

Warranty – enter relevant warranty information pertaining to the insulation.

Warranty Expiration – enter any expiration date associated with the warranty. The warranty date should be entered using the MM/DD/YYYY format.

Type – enter the type of membrane used on the roof section.

Attachment – enter the method used to attach the membrane to the substrate.

Roof Section Identification - Membrane (Cont.)

Reinforcement - enter the type of reinforcement used in the membrane.

Surfacing - enter the type of surfacing used on the membrane.

Walkways - enter the type(s) of walkways used on the roof section.

Roof Section Identification - Membrane (Cont.)

Flashing Information

Base Flashing - enter the type(s) of base flashing used on the roof section. Up to four types of base flashing may be entered.
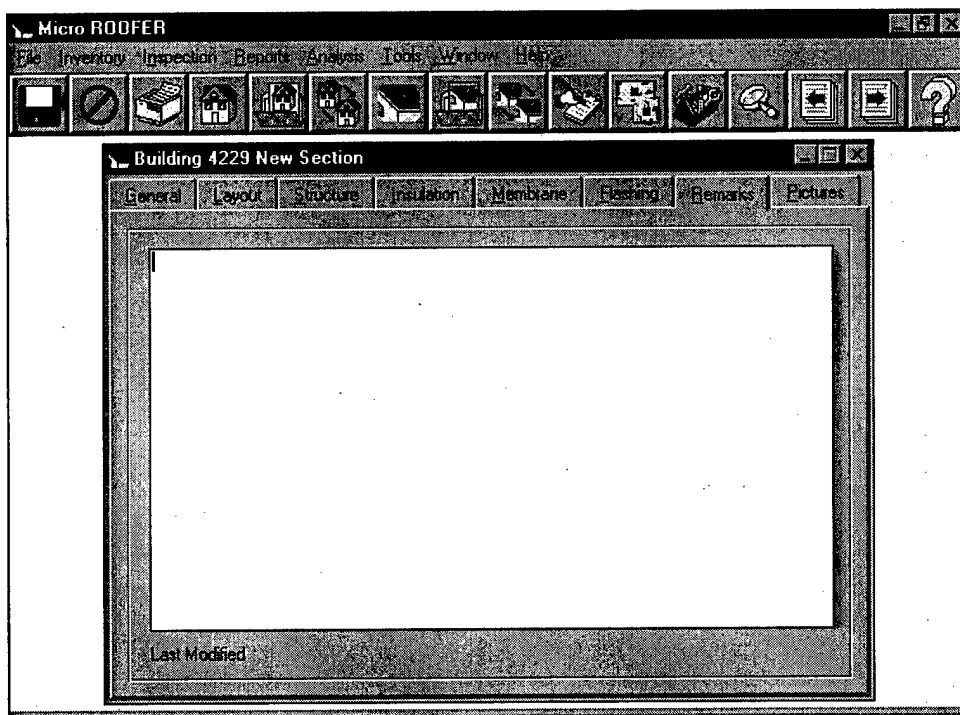
Flashing Adhesive - enter the type of flashing adhesive used on the roof section.

Counter-Flashing - enter the type of counter flashing used on the roof section.

Flashing Types - enter the type(s) of flashing details used on the roof section.

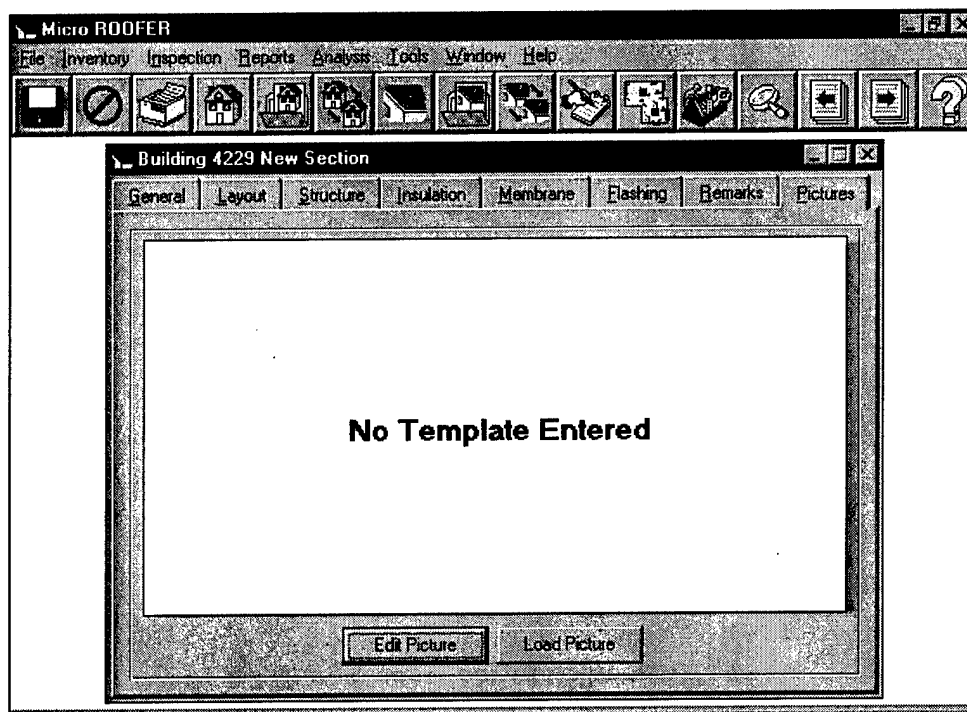# Roof Section Identification - Membrane (Cont.)

Remarks

Remarks - Enter any other relevant roof section remarks that could not be accommodated by the other roofing information folders.

Roof Section Identification - Membrane (Cont.)
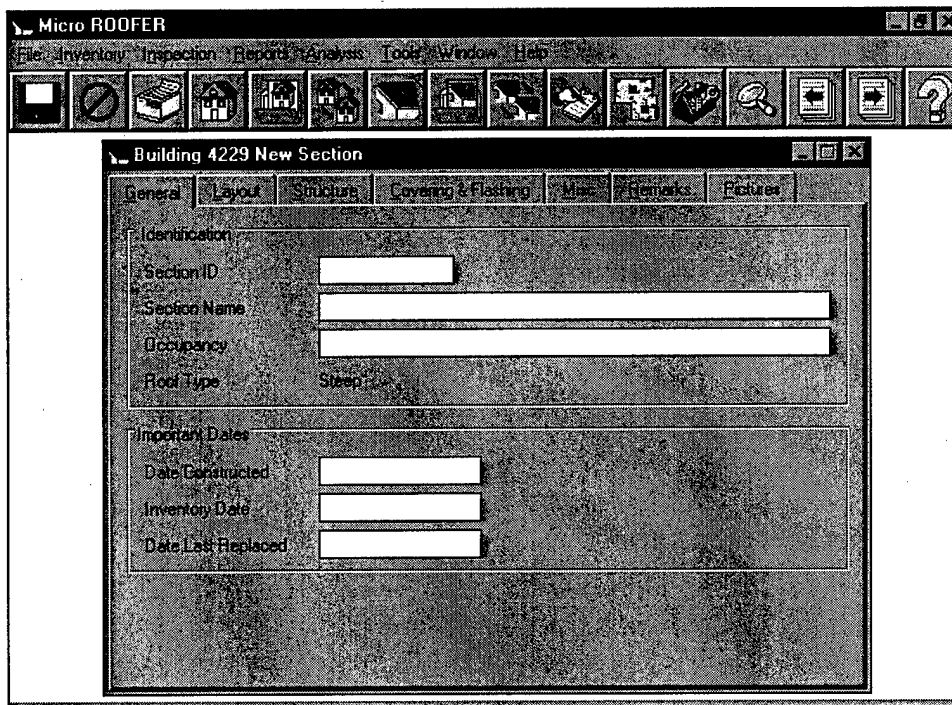
Pictures

Load Picture – allows you to load a picture (bmp format) that will be assigned to this roof section.

Edit Picture – edit the picture assigned to this section.

Roof Section Identification - Steep

General Information

Section ID - enter the section identifier.

Section Name - enter the section name.

Occupancy - enter the function under the roof section. Different roof sections of a building may have different occupancies under them (e.g., computer room).

Date Constructed - enter the date the roof section was constructed. The date for the roof construction must be later than or equal to the date the building's original construction using the MM/DD/YYYY format.

Inventory Date - enter the date the inventory was performed.

Date Last Replaced - enter the date when the roof membrane was replaced in the MM/DD/YYYY format. The date for the roof replacement must be later than or equal to the date of the building's original construction.

Roof Section Identification - Steep (Cont.)

Roof Layout

Roof Area - enter the square footage of the roof area.

Roof Access - enter the method used to gain access to the roof.

Perimeter - enter the length in feet of the perimeter of the roof section. This is categorized into: Parapet, Roof Edge, Expansion Joint, Area Divider, Adjacent Wall, and Other.

Adjacent Sections - If roof access is from an adjacent roof section, enter the neighboring roof section. This should only be used if the Roof Access value is defined as Adjacent Section.

Roof Types – enter the steep roof types that exist in this roof section.

Roof Section Identification - Steep (Cont.)

Structure and Drainage Information

Structural Frame Type - enter the structural framing type of the roof section.

Structural Deck Type - enter the structural element type that supports the shingles of the roof section.

Attachment Surface - enter the surface type the shingles are attached to.

Roof Slope - enter the predominate slope of the roof section.

Drainage Types - enter the method type(s) of removing rainfall from the roof section. Although up to seven drainage types may be entered, the menu window will only display four selections at one time.

Roof Section Identification - Steep (Cont.)

Covering and Flashing

Underlayment Types – enter the type of underlayment materials used for the roof covering.

Roof Covering Type - enter the type of roof covering.

Shingle Reinforcement - enter the type of reinforcement (for asphalt shingles).

Attachment - enter the method used to attach the roof covering units.

Flashing Types - enter the type(s) of flashing details used on the roof section.

Roof Section Identification - Steep (Cont.)

Miscellaneous Information

Accessories – enter the additional features that exist within this roof section.

Roof Overlaid – enter whether the current roof covering has been overlaid on top of a previous covering.

Layers – enter the total number of layers of roof covering systems.

Roof Section Identification - Steep (Cont.)

Remarks
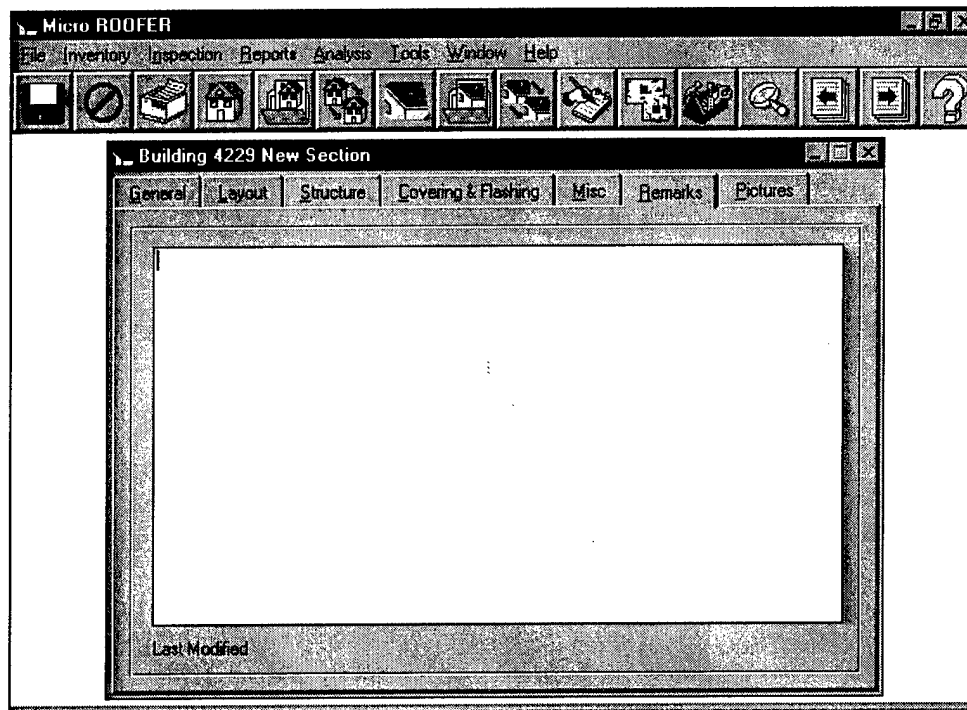
Remarks – Enter any other relevant roof section remarks that could not be accommodated by the other roofing information folders.

Roof Section Identification - Steep (Cont.)

Pictures
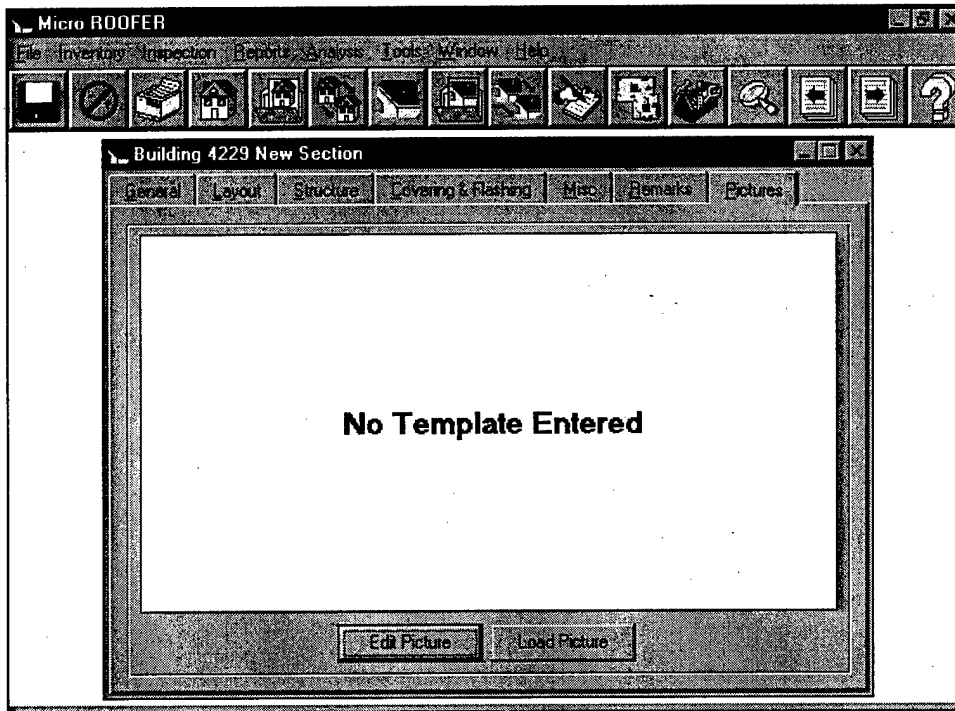
Load Picture – allows you to load a picture (bmp format) that will be assigned to this roof section.

Edit Picture – edit the picture assigned to this section.

Visual Inspection

The Visual Inspection data option stores information from the flashing and membrane inspection for a roof section. The MCI (Membrane Condition Index) and the FCI (Flashing Condition Index) are also calculated.

The Building Identification data and Roof Section information must be entered before any Visual Inspection data can be defined for a roof section. The Visual Inspection data consists of the following windows:

Window	Description
1	Visual Inspection Data Entry
2	Inspection Summary Report

Visual Inspection Data Entry

To enter data for a visual inspection, select the first option under the inspection pull-down menu. Select **New** if the inspection has no been previously entered, or select **Update** to modify an existing inspection record.
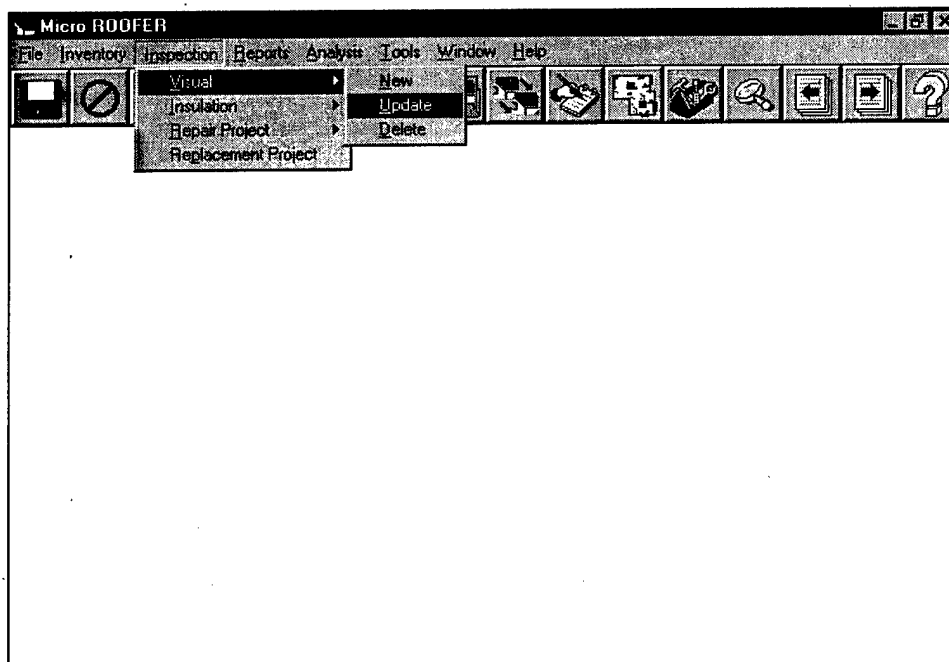
Visual Inspection (Cont.)

Next, the user is prompted to select the building ID and the section ID of the roof section to be accessed.
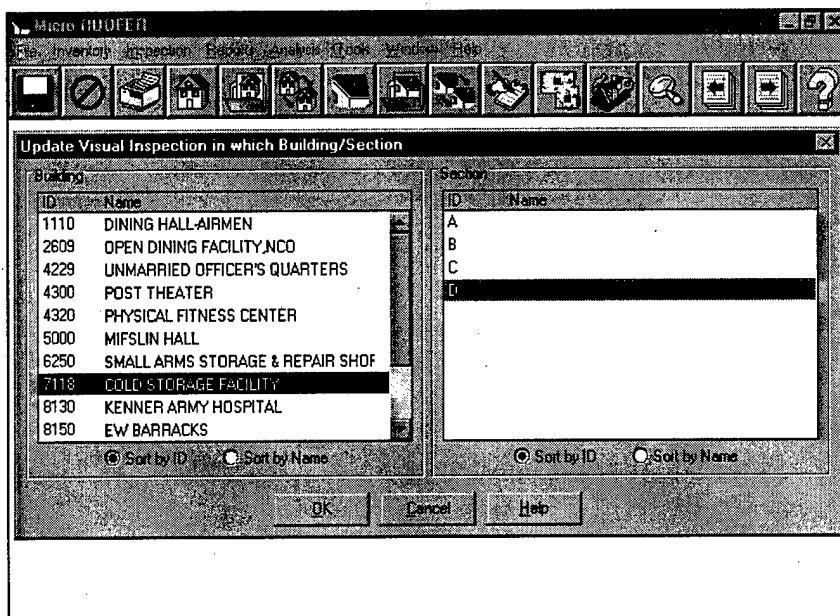
If the **Update** option is selected, Micro ROOFER for Windows will prompt the user to select the building, section, and date of the inspection to update. If **New Inspection** is selected, the following screen will be omitted and another data entry window will appear.
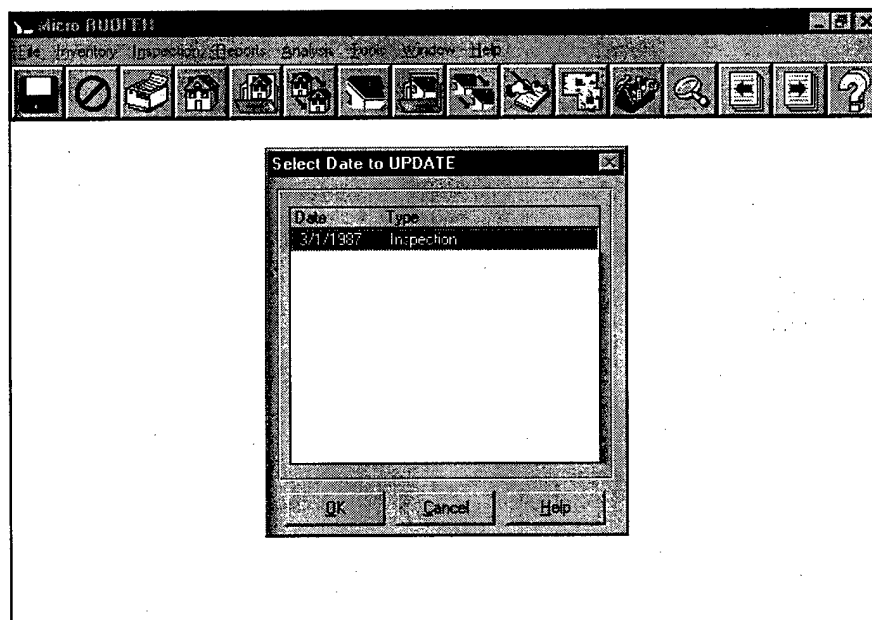
Visual Inspection (Cont.)

Once these choices have been made the visual inspection data entry window will appear as follows:

Inspection Date – The visual inspection date consists of eight numbers in the MM/DD/YYYY format. Either enter a new inspection date or edit a previously stored inspection date.

Perimeter Flashing – enter the total perimeter flashing length for the roof section. An integer field allowing a maximum of 99,999 feet and must be greater than zero.

Curb Flashing – enter the total curb flashing length for the roof section. An integer field allowing a maximum of 99,999 feet.

Enter all the distress data into the appropriate columns. Be sure to keep the data in the same sequence as on the Roof Inspection worksheet to maintain the proper identification numbers with the corresponding distress information and for proofreading the data entered. Data left blank will not interfere with calculations. However, entering blank data will create gaps in the sequence of identification numbers.

Visual Inspection (Cont.)

DIS – enter the type of distress. A field allowing a maximum of two characters (e.g., BF, EM, SR, BL). Allowable distress types are dependent on type of roof covering.

SEV – enter the severity level of the distress. An alphanumeric field allowing a maximum of one character. Valid values are: L for Low, M for Medium, and H for High.

NOTE: For some distresses, only one or two different severity levels are allowed.

If a change is made to existing Inspection Data, Micro ROOFER for Windows will prompt the user to save or cancel changes. If the record is saved, the user will be prompted to print a visual inspection summary report.

Insulation Inspection

This feature applies only to membrane roofing systems. The Insulation Inspection option stores information from the insulation inspection for a roof section. The Insulation Condition Index (ICI) is also calculated. The building identification data and roof section identification data must be entered before any insulation data can be defined. Also, an insulation type must be entered in the roof section identification data before insulation inspection data can be entered. For roof sections without insulation, no ICI inspection data can be entered. For further information, refer to the Roof Section Identification section of this chapter.

The insulation inspection data consists of the following windows:

Window	Description
1	Insulation Inspection Data Entry
2	Inspection Summary Report

To enter data for insulation inspection data, select the second option under the **Inspection** pull-down menu. Select **New** if the inspection has no been previously entered, or select **Update** to modify an existing inspection record.

NOTE: The condition index calculation report is generated using this data.
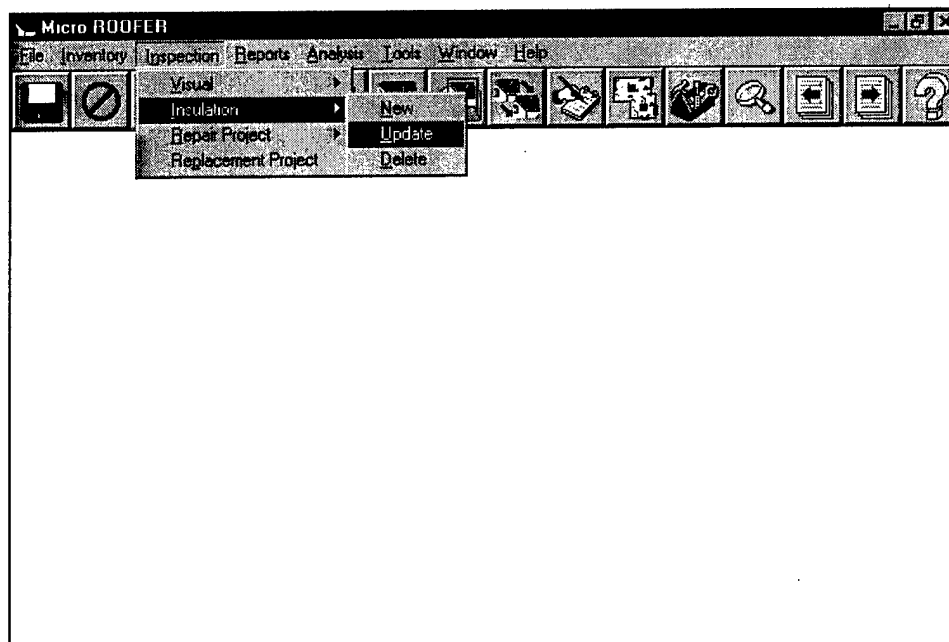
Insulation Inspection (Cont.)

In the next step, the user is prompted to select the appropriate building ID and section ID as follows:
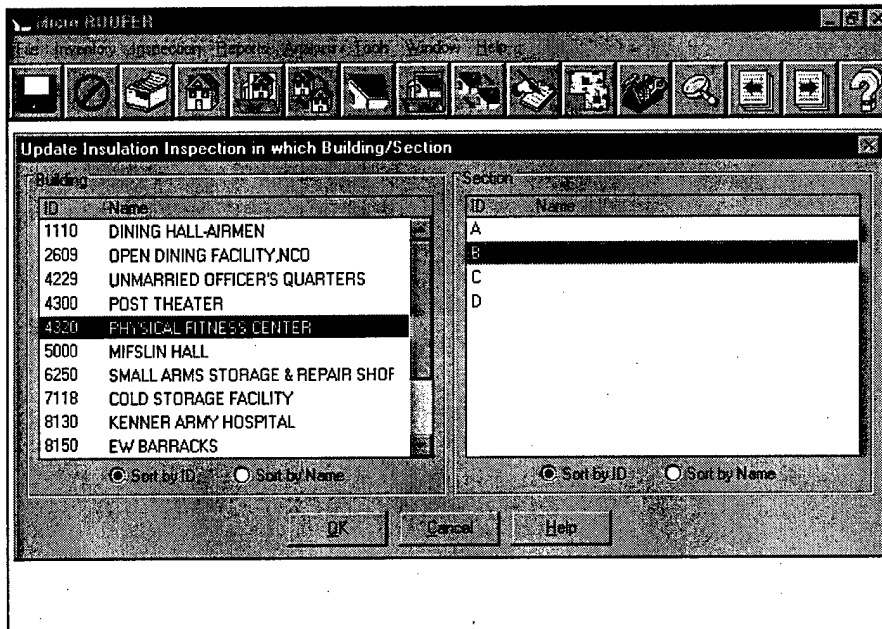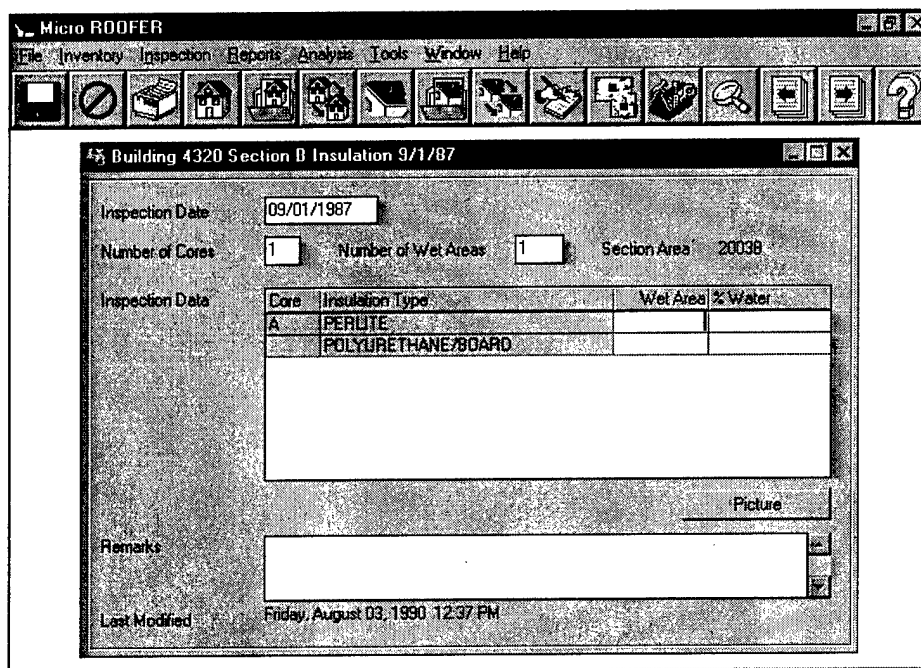
If the **Update** option is selected, Micro ROOFER for Windows will prompt the user to select the building and section ID and dates. If **New Inspection** is selected, the following screen will be omitted and the data entry window will appear.
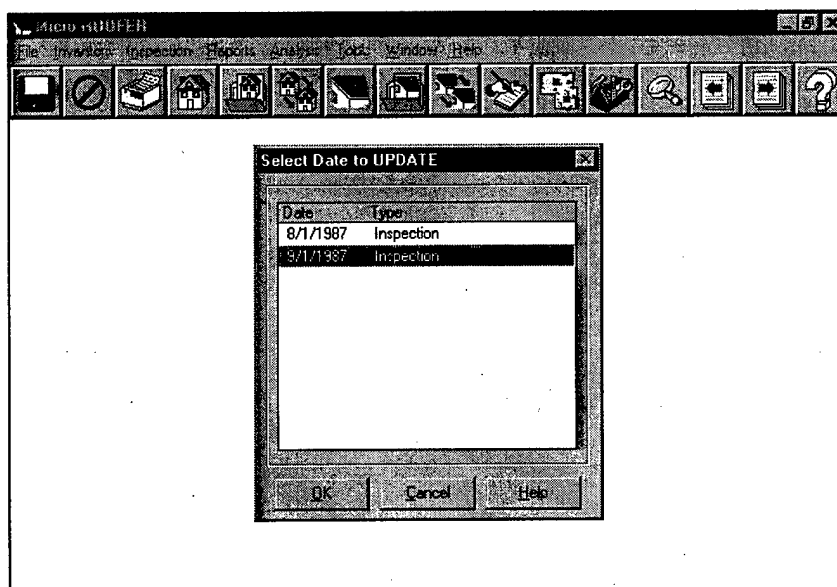
Insulation Inspection (Cont.)

Once these choices have been made the insulation inspection data entry window will
appear as follows:

Inspection Date – enter the date the inspection was performed (e.g., MM/DD/YYYY
format).

Number of Cores - enter the total number of cores representing wet areas on the
roof section.

Number of Wet areas - enter the total number of wet areas on the roof section.

Inspection Data Core - enter the core identification with letters of the alphabet.

Wet Area - enter the total area of wet insulation that the core sample represents.
An integer field allowing a maximum of 99999. This value must not be larger than
the roof section area.

% Water - enter the percent of water found in the core for each insulation type. An
integer field allowing a maximum of 9999%.

For additional information on these data entry fields and their descriptions, refer to
USACERL Technical Report M-90/04, *ROOFER: An Engineered Management Sys-*
tem for Bituminous Built-Up Roofs.

Insulation Inspection (Cont.)

If a change is made to existing inspection data, Micro ROOFER for Windows will prompt the user to save or cancel changes. If the record is saved, the user will be prompted to print an insulation inspection summary report.

The inspection summary report presents condition indexes and ratings for various components of the roof section.

Repair Project

If a roof section is repaired, the **Repair Project** option is used to record the information in the database and update the condition index. This option may be selected from the **Inspection** pull-down bar.
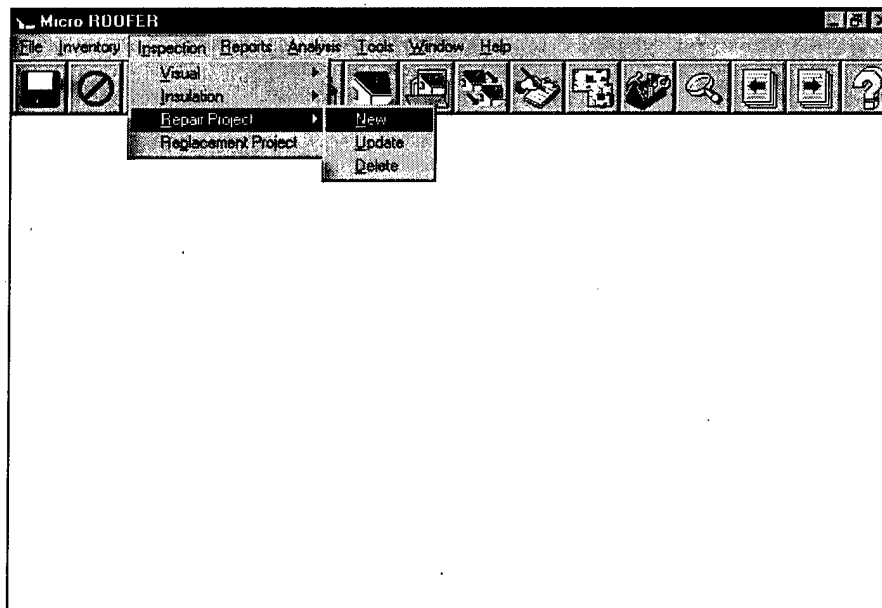
Next, the user is required to choose the appropriate building ID and section ID for the repair project data. If **Update** was selected, the user must then select the date of the repair project to be edited.
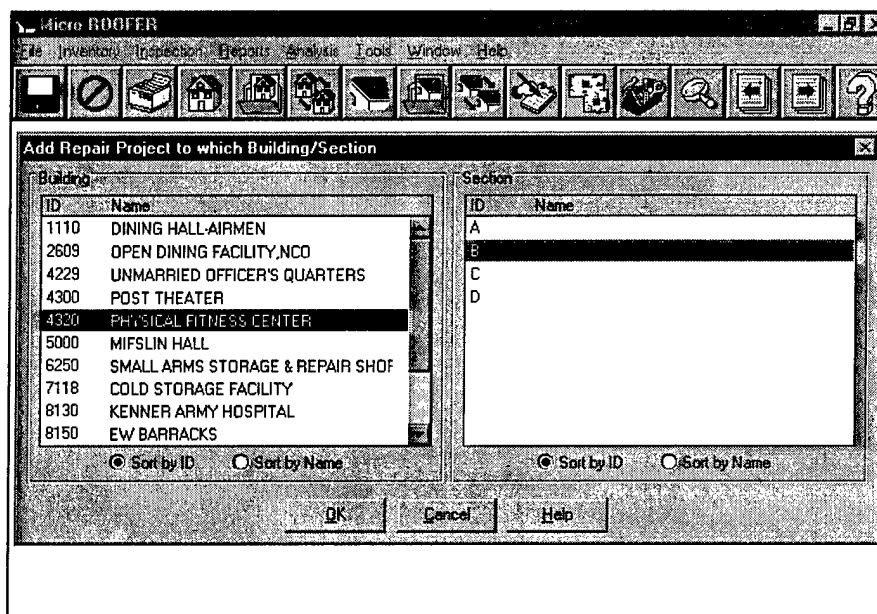
Repair Project (Cont.)

Within the Repair Project option there are three separate data entry folders.

General - Contains information related to the area that was repaired.

Visual Inspection - Contains information related to the membrane and flashing distresses that were repaired based on the last visual inspection.

Insulation Inspection - Contains information related to the wet insulation that was repaired based on the last insulation inspection.

General

Repair Date – enter the date that the repairs were made.

Remarks – enter general remarks pertaining to the roof repair project.

Repair Project (Cont.)

Visual Inspection

Inspection Data - enter the distress information extracted from the latest visual inspection and the repaired quantity for each distress.

Remarks – enter any additional remarks or comments about the repair.

Repair Project (Cont.)

Insulation Inspection

The following folder of information can be updated if insulation repairs are made.

Insulation Data – enter the insulation data extracted from the most recent insulation inspection record and Area Repaired quantities for each wet area.

Remarks – enter additional comments or remarks about this insulation repair.

Repair Project (Cont.)

Report

Once the information has been saved, the system will provide the opportunity to print a summary report.

Replacement Project

If a roof section has been replaced, the **Replacement Project** option is used to record this information in the database, update the condition index, and prompt the user to enter new inventory information for the roof section. This option may be selected from the **Inspection** pull-down bar.
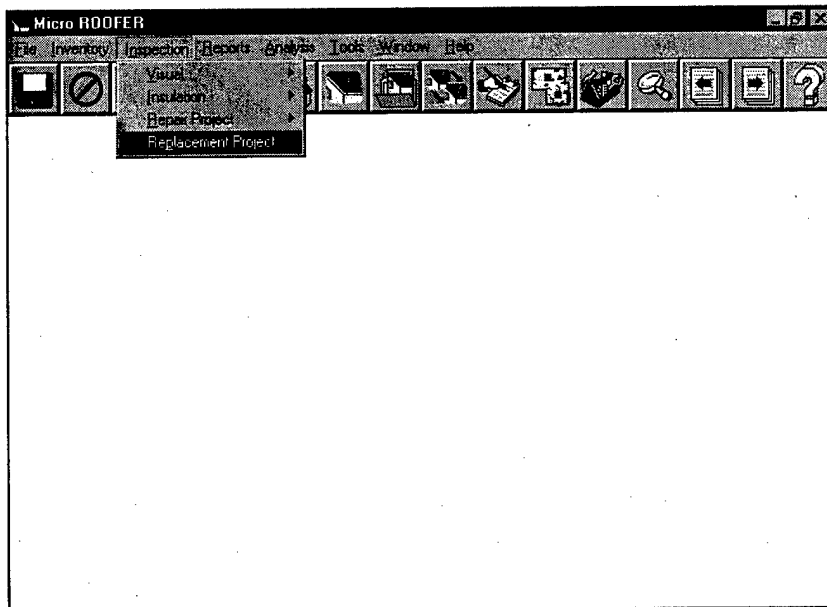
The user must choose the building ID and section ID for which the repair project data is to be applied.
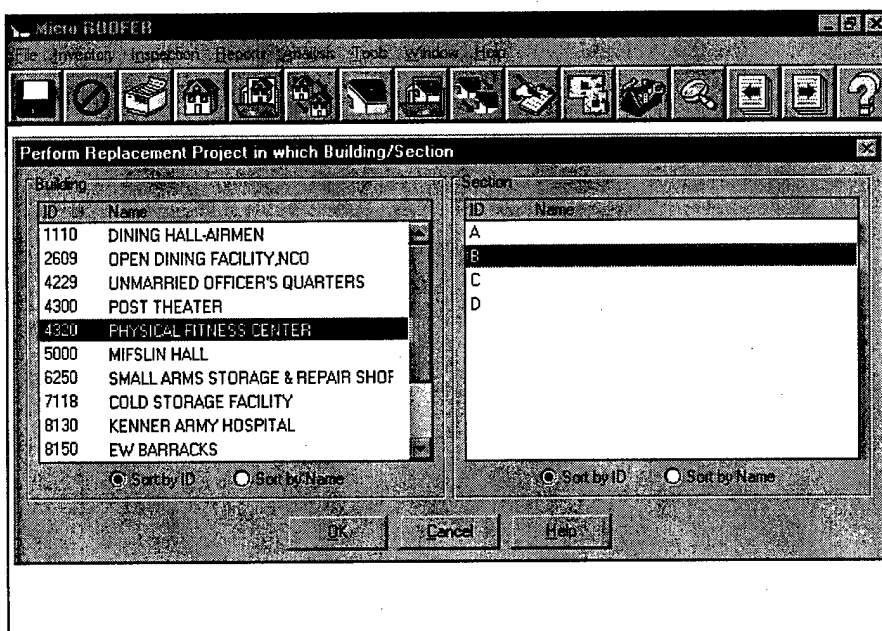
Replacement Project (Cont.)

After selecting a specific building ID, the user must enter a replacement date.
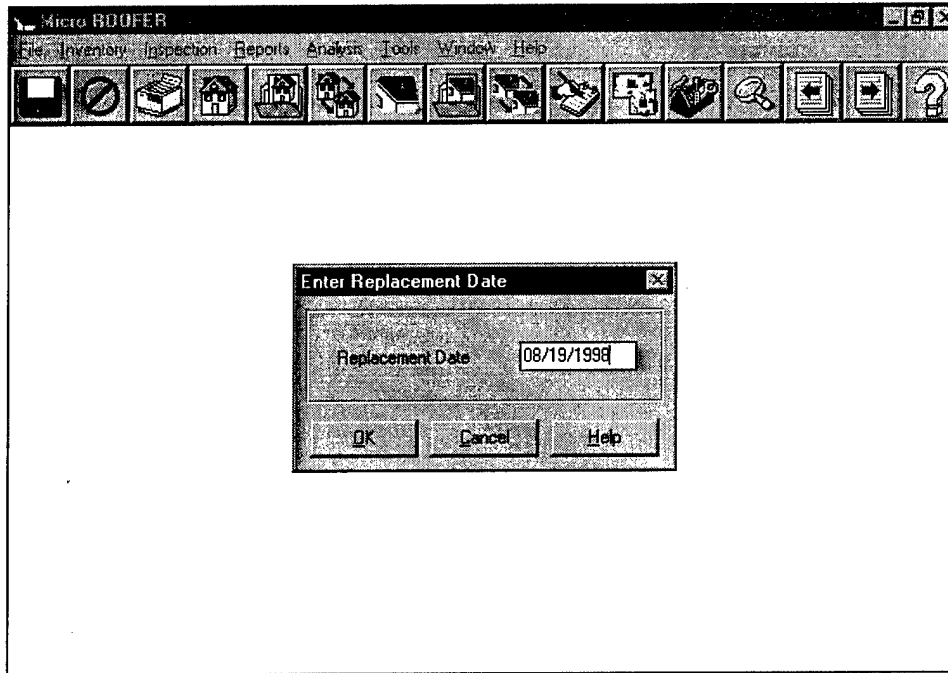
Replacement Project (Cont.)

A warning will appear advising that all previous inspection data will be deleted from the database as a result of the replacement project. Enter <**OK**> to continue with the replacement project.
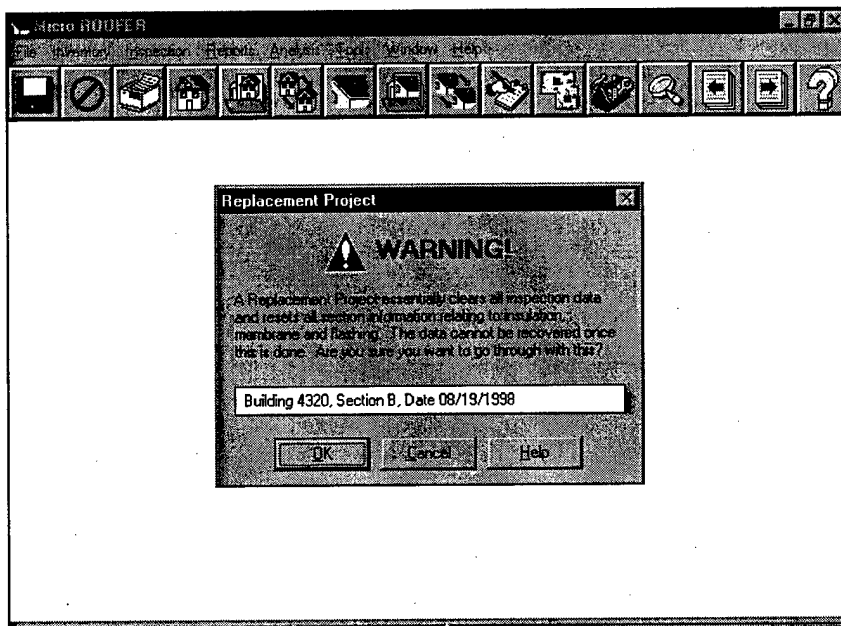
Once the data has been removed from the database as a result of the replacement project, a notification appears advising that new section information can be entered.
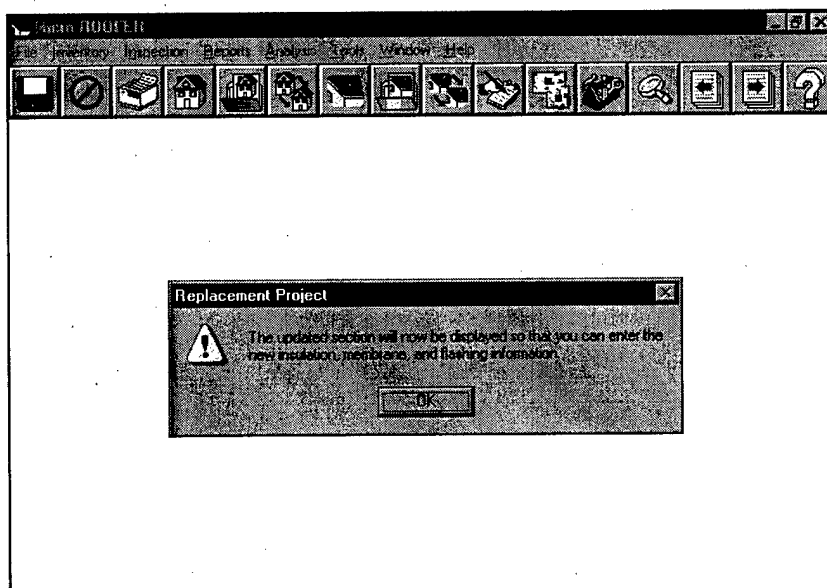
5 Reports

Introduction

This chapter will explain how to generate reports from access information stored in the Micro ROOFER for Windows database. All Micro ROOFER for Windows reports use criterion for selecting data elements that are included in the report. Options are also available for determining the element sorting order. Finally, the report output appearance can be selected. These options will be discussed in the Report General Information section of this chapter.

The database related reports menu selection is accessed by selecting the **Reports** pull-down menu. The following selections will appear on the screen:
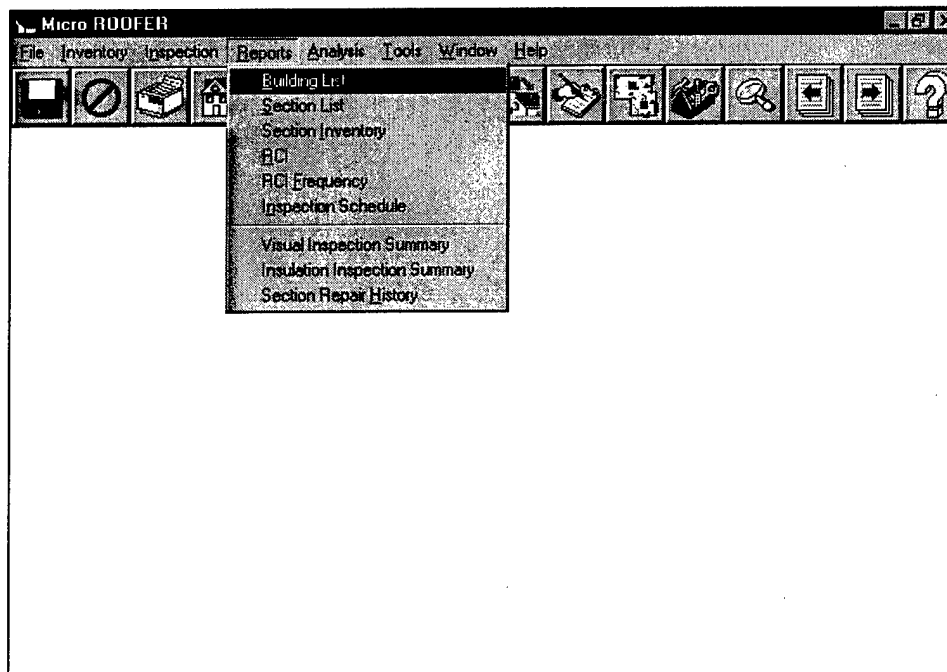
Report General Information

The Micro ROOFER for Windows reports use almost identical methods for:

- defining the criteria
- defining the sort order
- generating output

Defining the Criteria

From the database choose a report from the **Reports** pull down menu. To exit, without generating a report choose the <**Cancel**> button.

Various combinations of up to 10 of 12 elements are available for selecting and sorting information. These include:

Condition Index - Select the RCI (Roof Condition Index), FCI (Flashing Condition Index), MCI (Membrane Condition Index)/ SCI (Shingle Condition Index), or ICI (Insulation Condition Index) of a roof section.

Building Number - The number of the building.

Total Roof Area - The total roof area on a building.

Number of Roof Sections - The total number of roof sections on a building.

Facility Class - The facility class of the building, such as administrative or supply.

Roof Type - The type of roof covering on a roof section.

Insulation Type - The type(s) of insulation used on a roof section.

Deck Type - The structural element type that supports the insulation and membrane of the roof section.

Roof Slope - The slope of the roof section.

Section Area - The area of the roof section.

Last Construction Year - The last construction year for a roof section.

Last Inspection Year - The last inspection year for a roof section.

The selection elements for the building list report are displayed in the box shown below. To edit the reporting selection criterion, choose the appropriate option from the **Building List** screen by highlighting an item and pressing **Change Selection.** The option that is chosen here will determine the overall selection criterion for the report. Press **Reset List** to delete the selection.

Report Selection Criteria

Select the **All** selection to choose all.
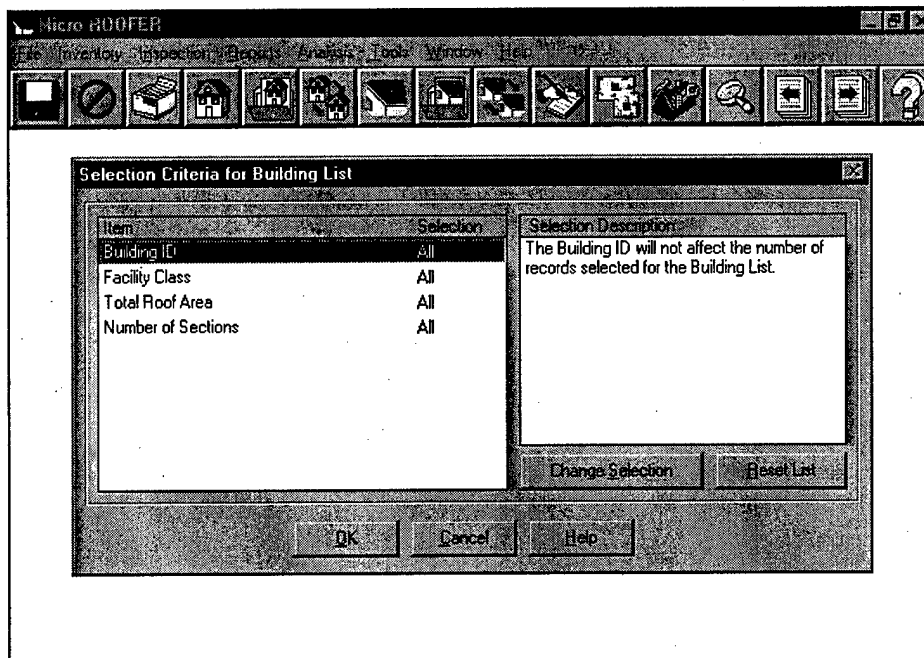
In this screen, all of the options listed are for the selected item in the left box and default to the **All** selection criterion.
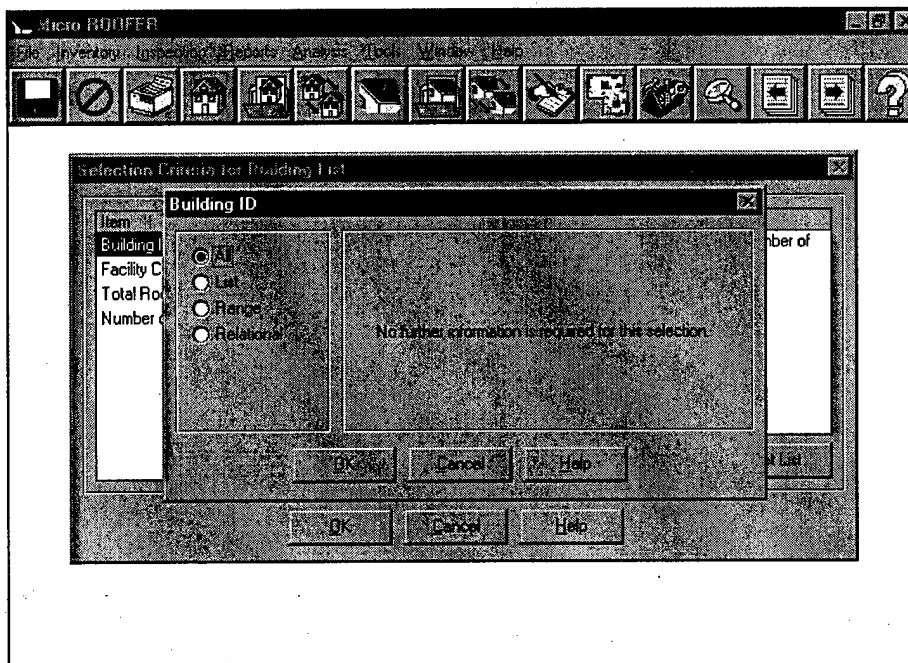
Report Selection Criteria (Cont.)

Select the **List** option to choose the items you want included in the report. In this example, if the building number is being edited and the **List** criteria is selected, the user can enter the building IDs to be included in the report. To delete the selection, press **Cancel**.
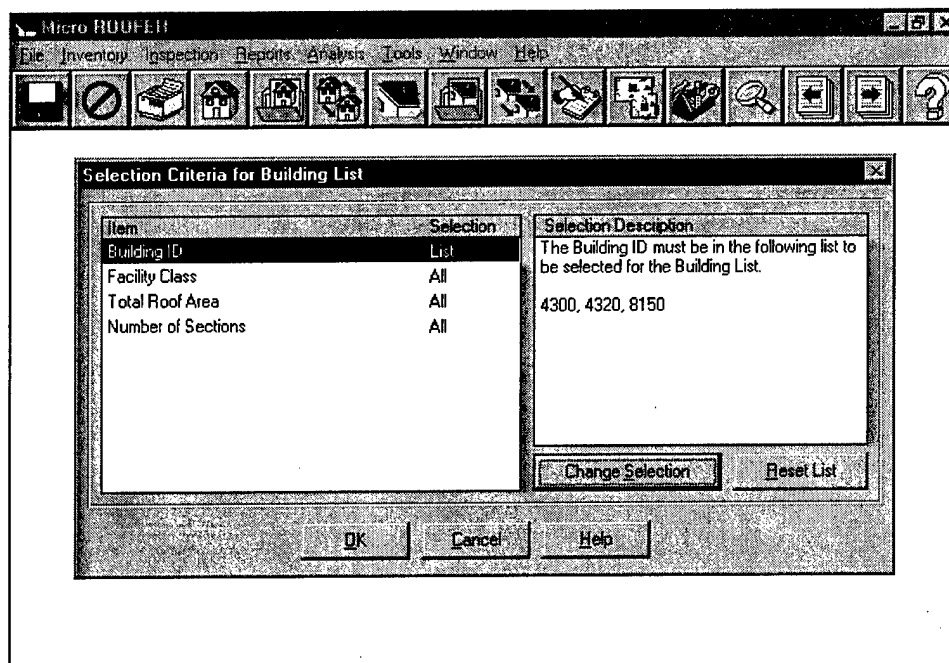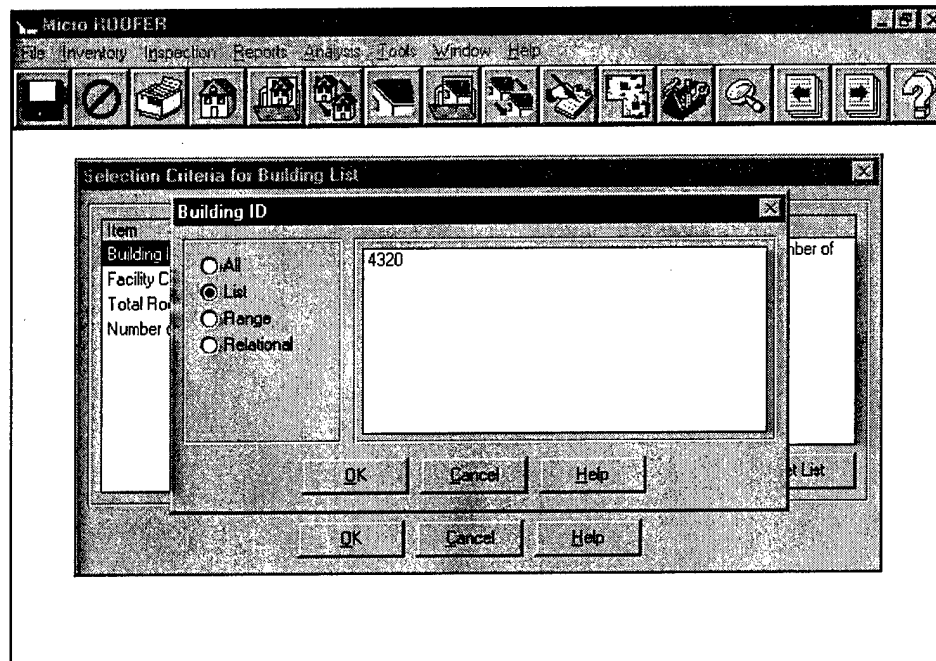
Report Selection Criteria (Cont.)

Select the **Range** option to choose a range of items to be included in the report. For example, if building ID is being edited, the **Range** option will display fields to enter a **From & To** value. To delete the selection, press **Cancel**.
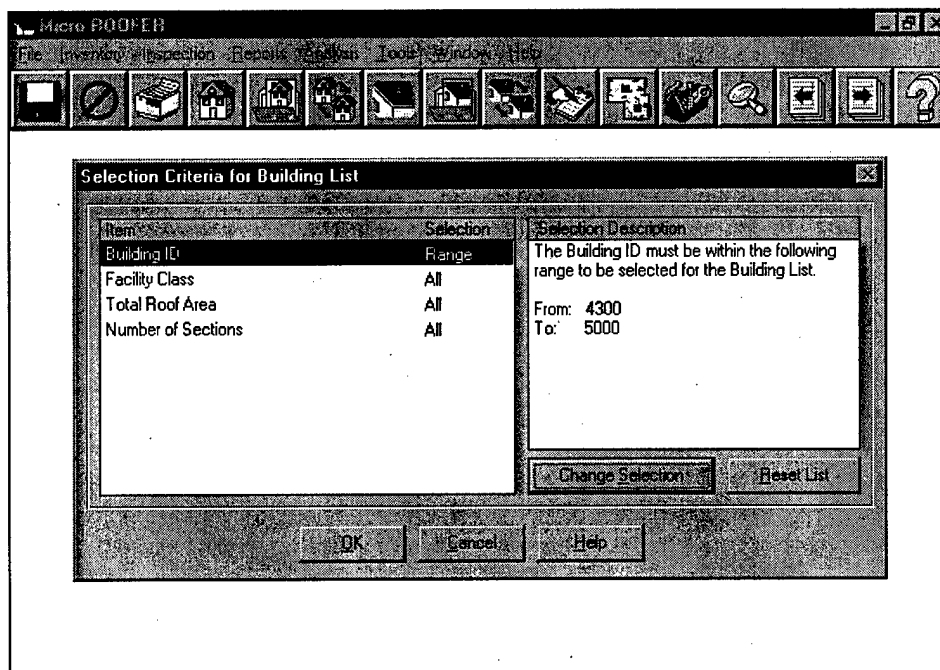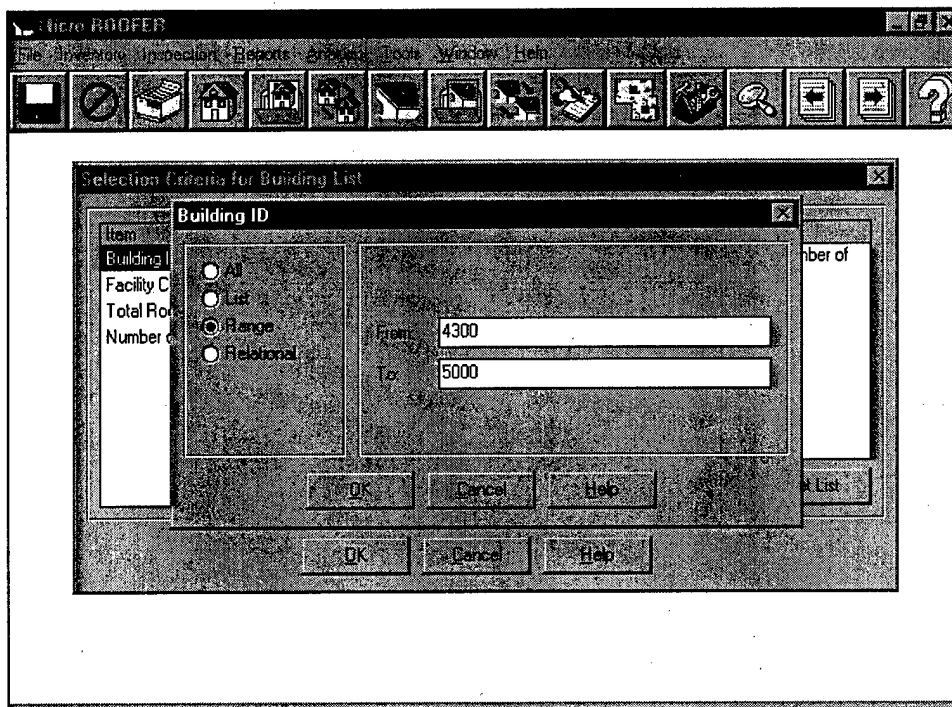
Report Selection Criteria (Cont.)

Select the **Relational** option to choose selection operators to determine which records to include in the report. For example, if building ID is being edited, the word **Relational** will display a selection of query expressions that can be used to sort out unwanted records. To delete the selection, press **Cancel**.
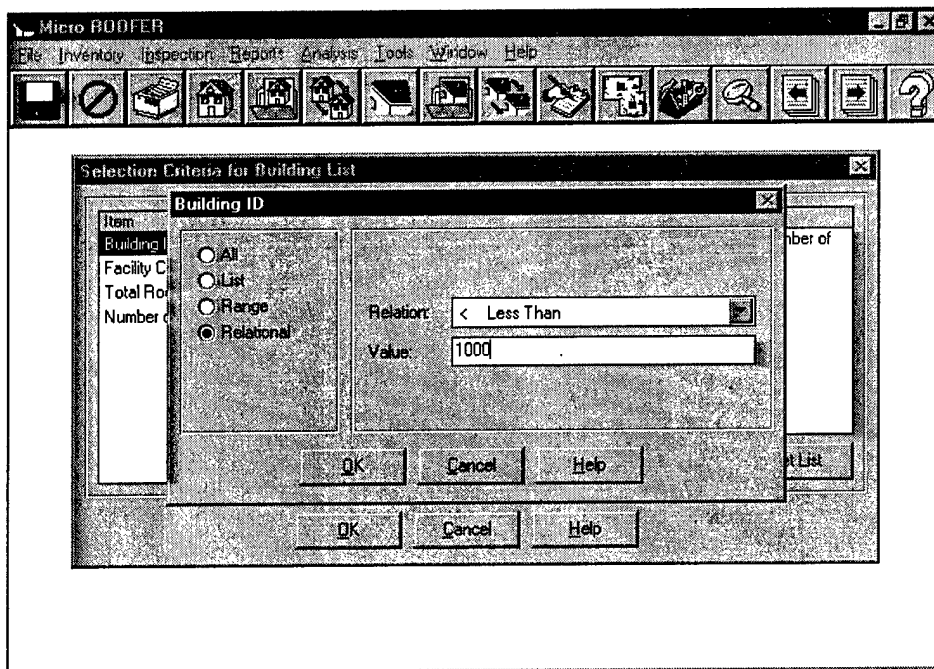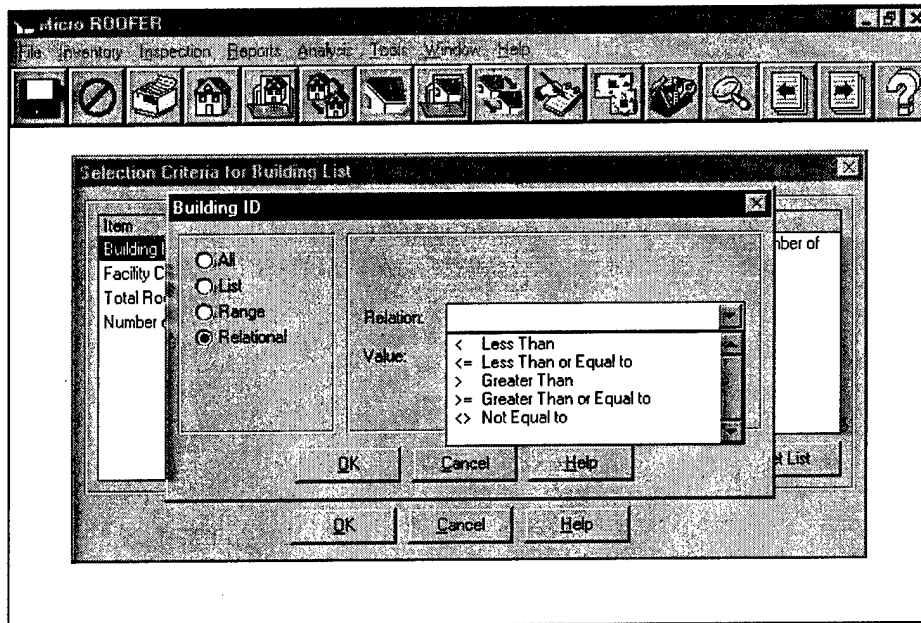
Report Selection Criteria (Cont.)
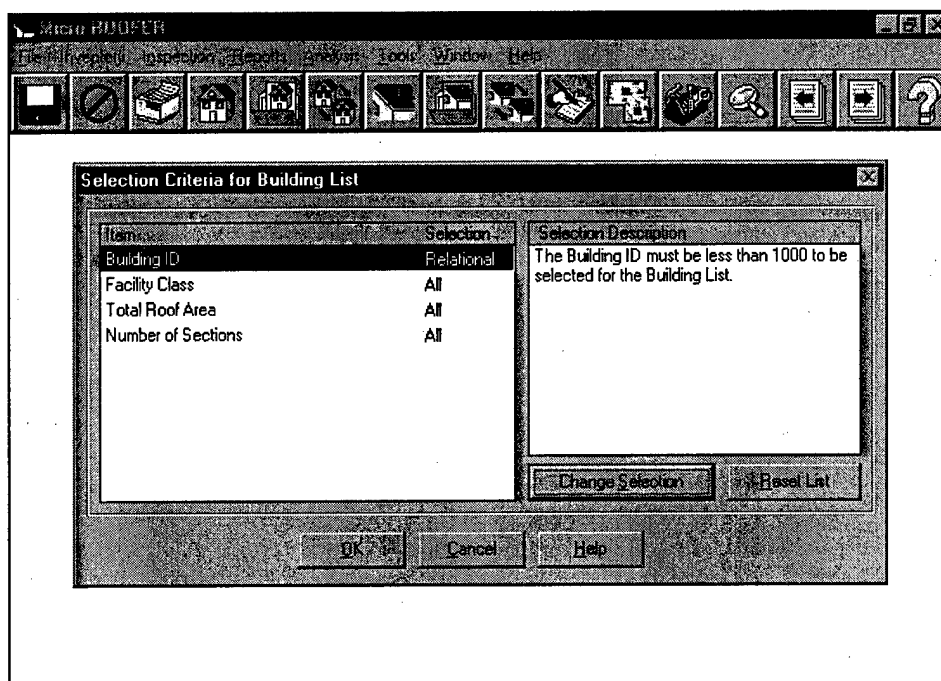
In the example above, only the building IDs that are less than 1000 are going to be included in the report.

Selections can be made on any or all elements as needed and can be used in any combination for a particular report.

After selecting the elements' criterion, select the **<OK>** button to proceed.

Defining the Sort Order

A sort order option is available to set up a particular sorting of data for report output. If an ascending order is desired, highlight an option from the **Fields to Choose From** box, then click on the **Add Ascending** box. This will place the item under the **Fields to Sort By** box. Press **Remove From List** to delete a choice.

NOTE: If a choice is made to sort in an ascending order, an up-arrow marker will appear on the left next to the field selection. Additionally, some sorted data may be "nested" inside another group of sorted data. The primary sort (first selection in the **Fields to Sort By** box) is the order in which the data will appear in the report. The secondary sort will appear, but will be in order only within the primary sort order, and so on with other respective sort levels.
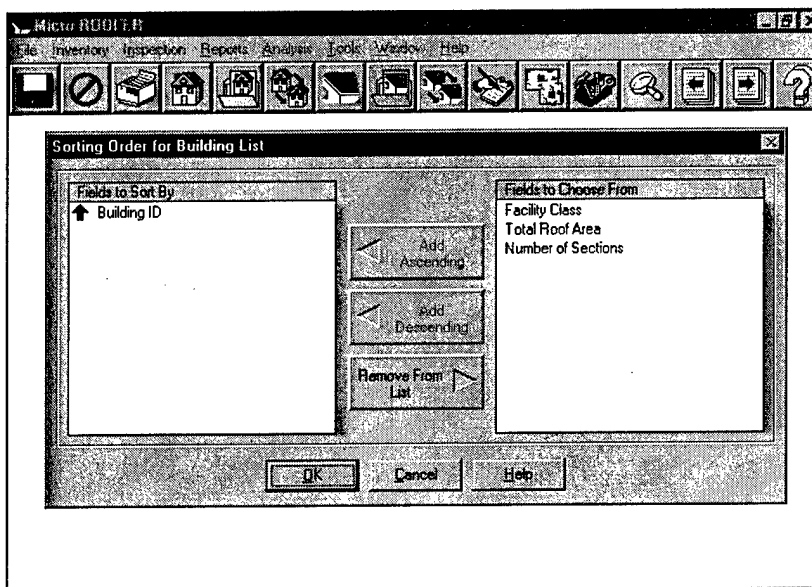
If a descending order is desired highlight an option from the **Fields to Choose From** box, then click on the **Add Descending** box. This will place the item under the **Fields to Sort By** box. After highlighting a selection, press **Remove From List** to delete a choice.

Note: If a choice is made to sort in a descending order, a down-arrow marker will appear on the left next to the field selection. When the sort order has been selected, click on the <**OK**> button to proceed. If you wish to cancel your report selections, click on the <**Cancel**> button.

If you want help regarding the use of this window, click on the <**Help**> button for further information.

Defining the Sort Order (Cont.)

Once a report choice has been made, a window similar to the following one will appear. During the time this screen is displayed, users will be able to track the progress of the report preparation. When completed, the report output will be displayed on the screen. The user my cancel the report generation by clicking on the **<Cancel>** button displayed on the screen.
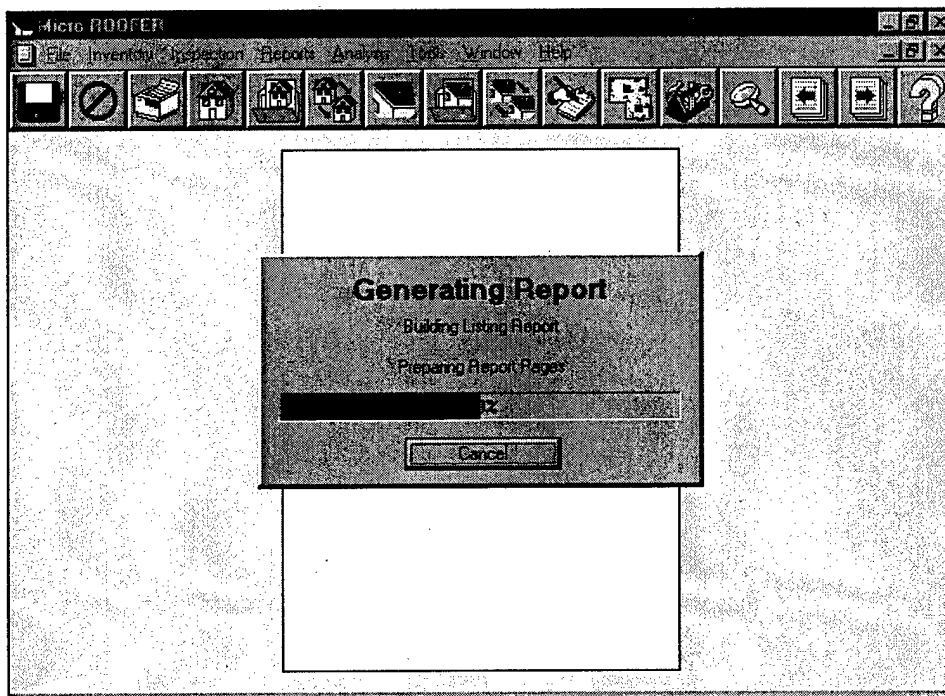
Report Output

The page printout will appear on the user's window by default. Users may either scroll through the printout pages (using the left/right arrow buttons from the Micro ROOFER for Windows toolbar), or they may choose to zoom in and look for a specific piece of information (using the magnifying glass button).
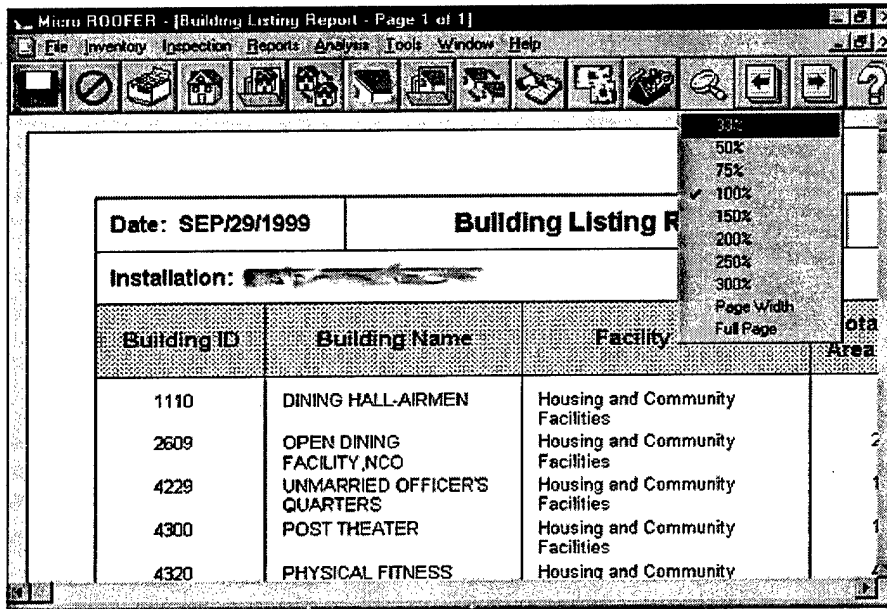
Report printouts may be obtained by choosing the printer button from the Micro ROOFER for Windows toolbar:
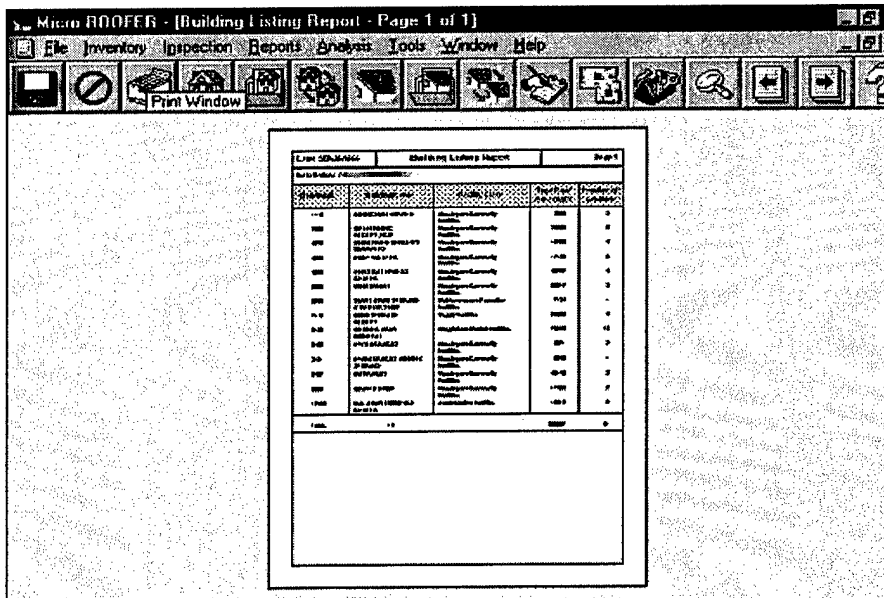
Building List Report

This report lists the general information about all selected buildings. Information is taken from the data that is entered via the building identification data entry module.

The following options are available for criterion selection and sorting:

Element	All	List	Range	Relational	Sortable
Building ID	X	X	X	X	X
Facility Class	X	X			X
Total Roof Area	X	X	X	X	X
Number of Roof Sections	X	X	X	X	X

Micro ROOFER - [Building Listing Report - Page 1 of 1]

File   Inventory   Inspection   Reports   Analysis   Tools   Window   Help

Date: SEP/29/1999	Building Listing Report		Page 1

Installation:

| Building ID	Building Name	Facility Class	Total Roof Area (SqFt)	Number of Sections
1110	DINING HALL-AIRMEN	Housing and Community Facilities	3959	3
2609	OPEN DINING FACILITY,NCO	Housing and Community Facilities	20539	6
4229	UNMARRIED OFFICER'S QUARTERS	Housing and Community Facilities	10496	4
4300	POST THEATER	Housing and Community Facilities	17136	5
4320	PHYSICAL FITNESS CENTER	Housing and Community Facilities	48722	4
5000	MIFSLIN HALL	Housing and Community Facilities	56612	8
6250	SMALL ARMS STORAGE & REPAIR SHOP	Maintenance and Production Facilities	7134	1

Section List Report

This report lists specific information about the selected roof sections. Information is taken from the data entered via the roof section identification data entry module.

The following options are available for criterion selection and sorting:

Element	All	List	Range	Relational	Sortable
Building ID	X	X	X	X	X
Facility Class	X	X			X
Roof Type	X	X			X
Insulation Type	X	X			
Deck Type	X	X			X
Roof Slope	X	X			X
Section Area	X	X	X	X	X

Section Inventory Report

This report lists all the information from the roof section identification data for each section selected.

The following options are available for criterion selection and sorting:

Element	All	List	Range	Relational	Sortable
Building ID	X	X	X	X	X
Facility Class	X	X			X
Roof Type	X	X			X
Insulation Type	X	X			
Deck Type	X	X			X
Roof Slope	X	X			X
Section Area	X	X	X	X	X

```
Micro ROOFER - [Section Inventory Report - Page 1 of 61]

File  Inventory  Inspection  Reports  Analysis  Tools  Window  Help
```

Date: SEP/29/1999	Section Inventory Report	Page 1

Installation:

Building No.:	1110	Section: A	Area:	911 Sq.Ft.
Last Replacement:			Original Construction:	1957
Occupancy:	MESS HALL			

Perimeter
Parapet: 0 Ft.   Exp. Joint: 0 Ft.   Adj. Wall: 65 Ft.
Roof Edge: 103 Ft.   Area Div.:   0 Ft.   Other: 0 Ft.

Access: EXTERNAL LADDER: Temporary
Adj Roof Sec: B

Structural Frame: STEEL: Bar Joists/Bearing Wall
Roof Deck: GYPSUM: Fiberboard Form
Slope: 3/8 in 12
Drainage: GUTTERS & DOWNSPOUTS
Vapor Retarder: NONE

Insulation: NONE
Thickness: 0 In.   Layers: 0   Tapered:
R-Value: 0

RCI Report

This report lists results of the RCI calculations for all roof sections chosen in the selection criteria. The RCI calculations are produced from information entered in the most recent Visual Inspection and Insulation Inspection options of the data entry module.

The following options are available for criterion selection and sorting:

Element	All	List	Range	Relational	Sortable
Condition Index	X	X	X	X	By RCI
Building ID	X	X	X	X	X
Facility Class	X	X			X
Roof Type	X	X			X
Insulation Type	X	X			
Deck Type	X	X			X
Roof Slope	X	X			X
Section Area	X	X	X	X	X
Last Construction Year	X	X	X	X	X
Last Inspection Year	X	X	X	X	X

RCI Frequency Report

This report presents a statistical and graphical representation of the overall frequency of conditions based on the RCI for all roof sections chosen in the selection criteria. The RCI calculations are computed from information entered in the most recent Visual Inspection and Insulation Inspection data fields. This report lists the occurrence frequency of each RCI range by number of sections, percentage of sections, total area, and percentage of total area.

The following options are available for criterion selection and sorting:

Element	All	List	Range	Relational	Sortable
Condition Index	X	X	X	X	By RCI
Building ID	X	X	X	X	X
Facility Class	X	X			X
Roof Type	X	X			X
Insulation Type	X	X			
Deck Type	X	X			X
Roof Slope	X	X			X
Section Area	X	X	X	X	X
Last Construction Year	X	X	X	X	X
Last Inspection Year	X	X	X	X	X

The RCI Frequency Report can be generated based on RCIs compiled from data or based on projected RCIs from future years. The Projected RCI Frequency report provides a representation of roof conditions for the projected year assuming no repairs or replacements are done. The following calculation options are available when running the RCI Frequency Report:

- calculate RCI based on current inspections
- calculate RCI for the current year
- calculate RCI for some years in the future
- calculate RCI for a certain year
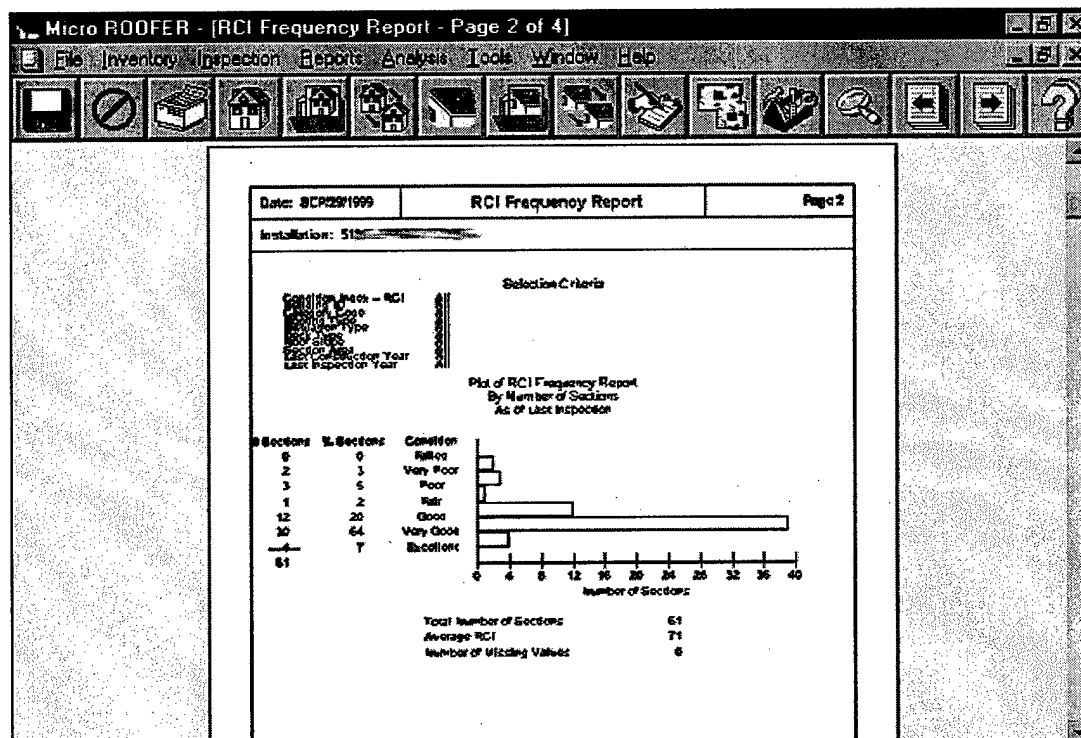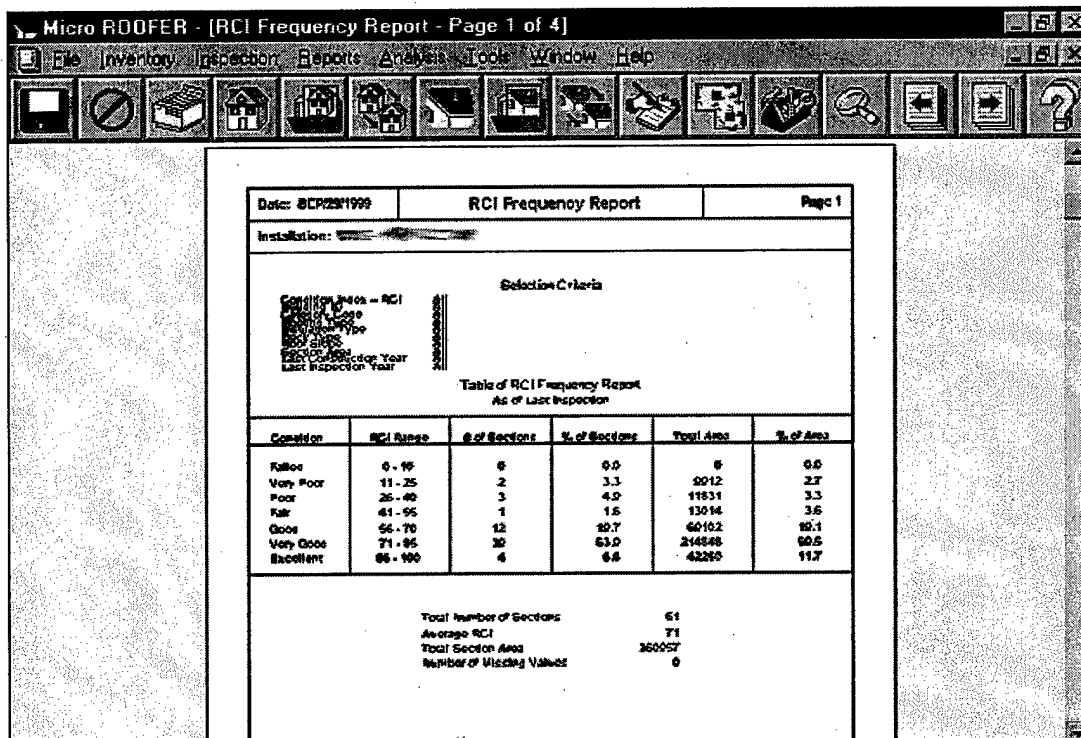
RCI Frequency Report (Cont.)
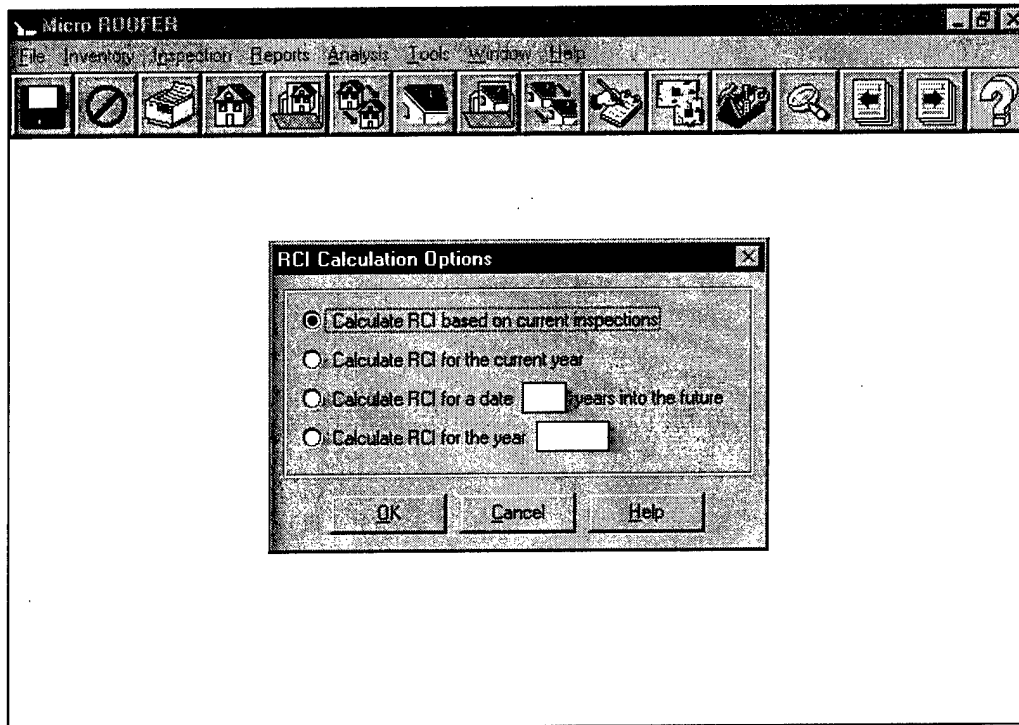
Three types of condition summary information is provided by the report output:

RCI Frequency Report-page 1
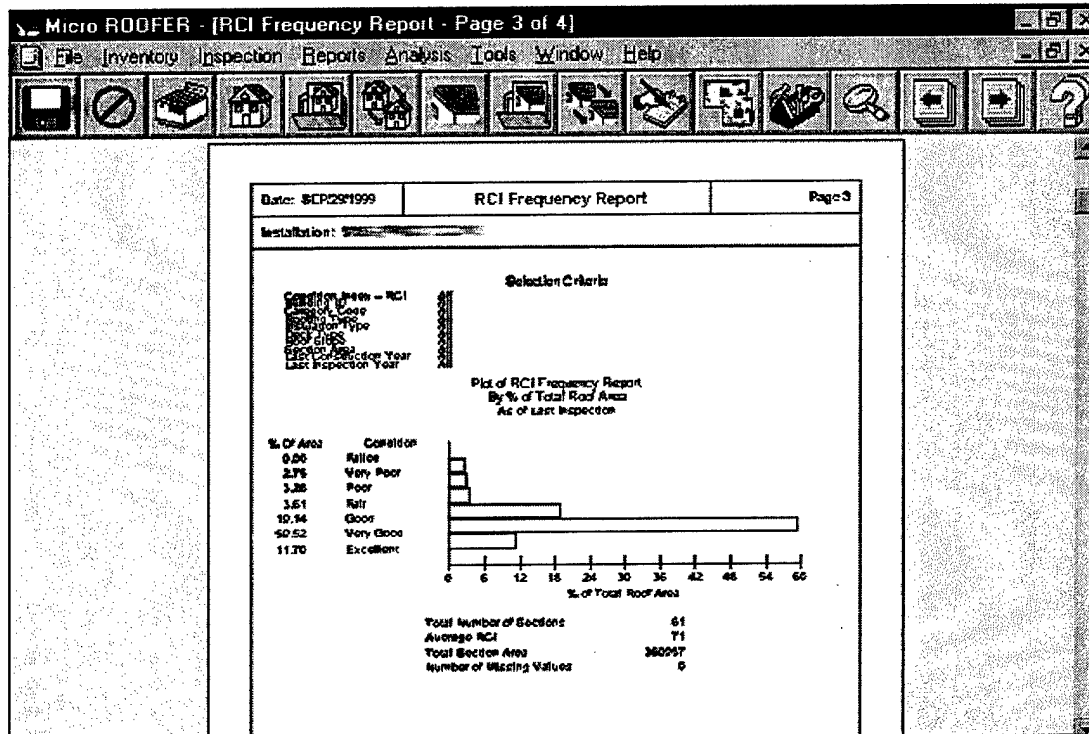(Data Summary Table)

RCI Frequency Plot - page 2
(Plot of RCI Frequency by Number of Sections)

RCI Frequency Plot - page 3
(Plot of RCI Frequency by % of Total Roof Area)

RCI Frequency Report (Cont.)

RCI Frequency Report (Cont.)

Inspection Schedule Report

This report option contains the Schedule Table, Schedule Plot, Section List, and Missing Value List for future inspections. The inspection schedule is based on allowed years between inspections for various RCI ranges. All or any combination of these reports can be generated.

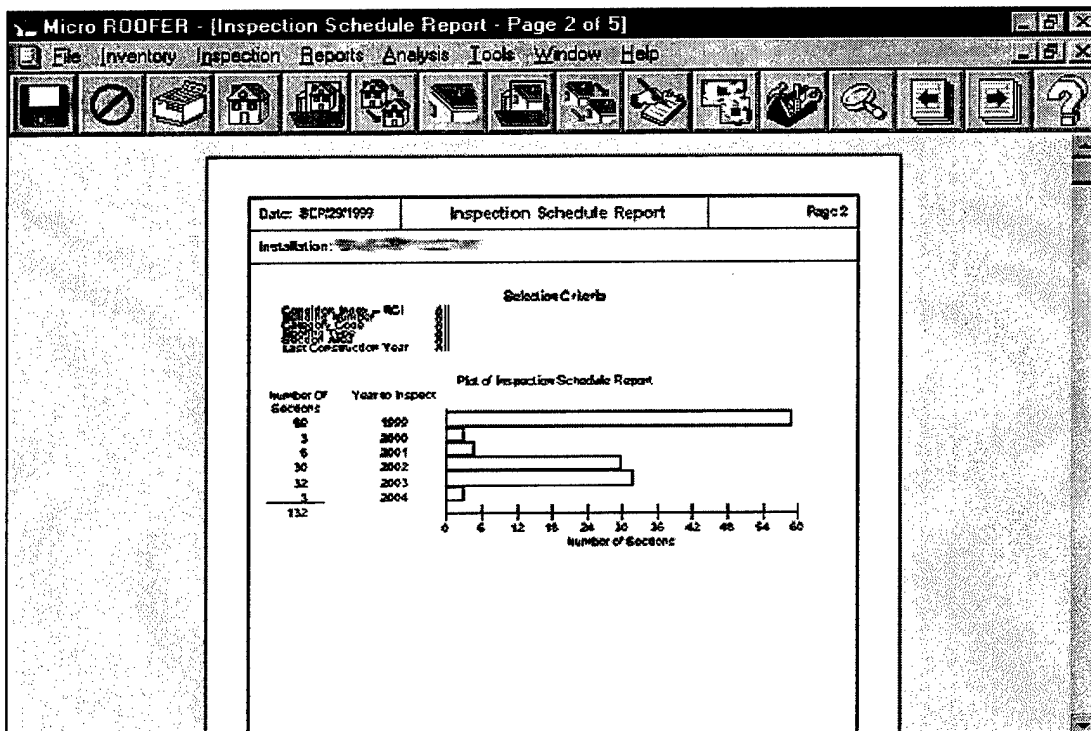The following options are available for criterion selection and sorting:

Element	All	List	Range	Relational	Sortable
Condition Index	X	X	X	X	By RCI
Building ID	X	X	X	X	X
Facility Class	X	X			X
Roof Type	X	X			X
Section Area	X	X	X	X	X
Last Construction Year	X	X	X	X	X

Once the selection criterion is completed, Micro ROOFER for Windows will provide the following information for choosing additional constraints:
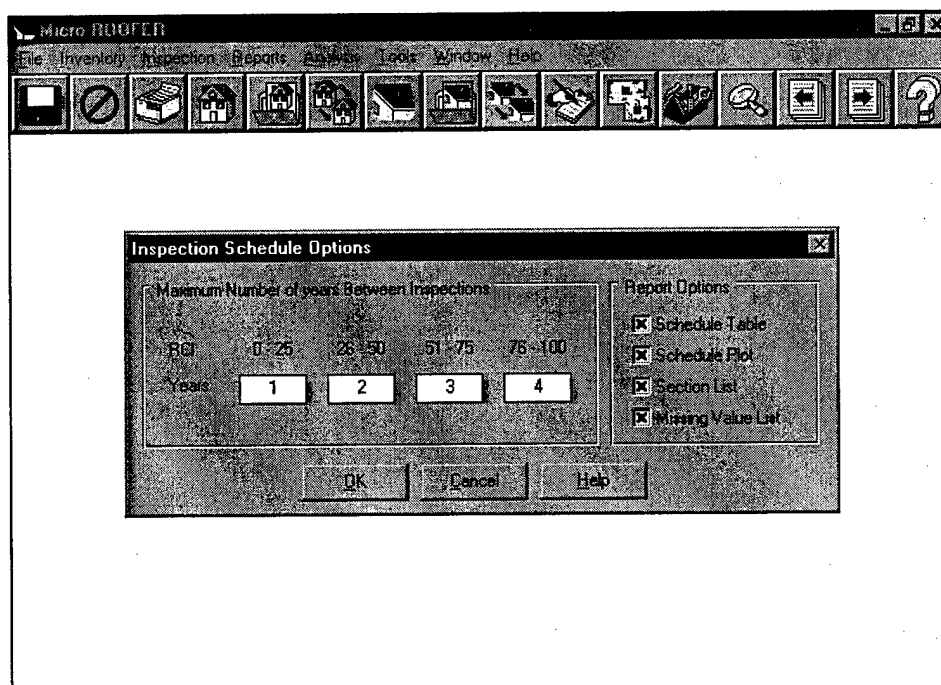
Enter the maximum number of years allowed for each range of current condition index. The default values are already displayed in the current Micro ROOFER for Windows screen. If no edits are made, these figures will be used in generating the report data.

Inspection Schedule Report (Cont.)

Inspection Schedule Report (Cont.)

6 Analysis

Introduction

The data analysis programs for performing repair and replacement analysis and editing cost values in Micro ROOFER for Windows include:

- Maintenance Repair and Replacement (MR&R) Analysis
- MR&R Analysis Summary
- Ten-Year Budget Plan
- Distress Analysis
- Edit Cost Values
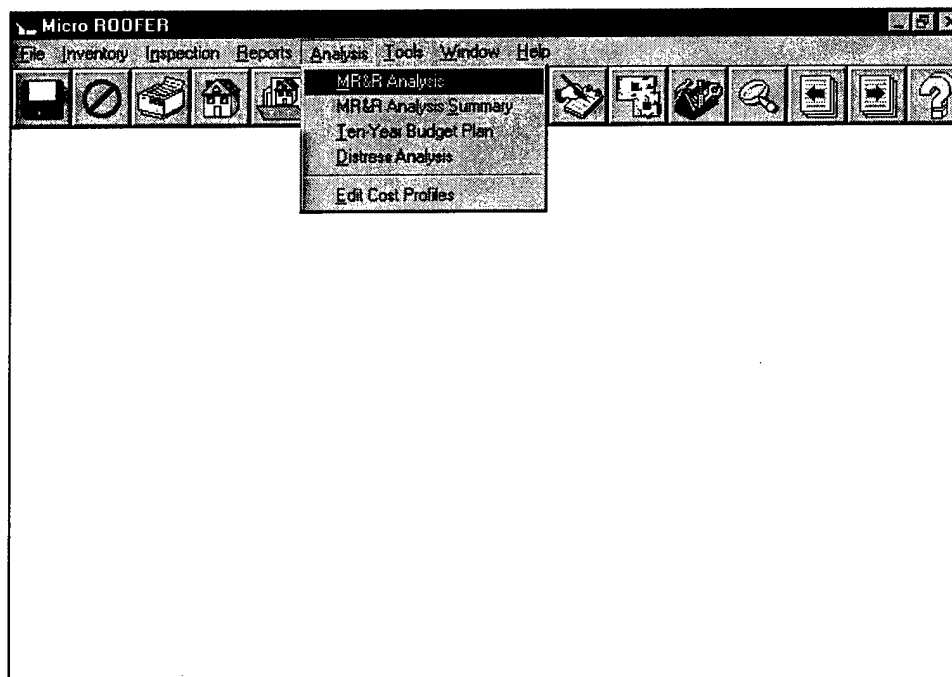
Maintenance Repair and Replacement Analysis (MR&R Analysis)

The MR&R Analysis consists of a project level cost analysis of the designated roof section to determine if repair or replacement should be performed. Before running this option, data must be entered into the Micro ROOFER for Windows visual inspection data entry module.

NOTE: Refer to the previous chapter, Visual Inspection, for more information on entering visual inspection data into the database.

The MR&R Analysis option is chosen by selecting the first option from the **Analysis** pull-down bar menu. Users need to select the building ID and section ID for the analysis information needed.

MR&R Analysis (Cont.)

Once the building and section are selected, the following information will appear on the screen:

Building - building ID

Section - section ID

Section Area - roof section area (in square feet)

Originally Constructed/Last Replaced - Either the year the roof was constructed or the most recent year that the roof was replaced (e.g., using the YYYY format).

Predicted Year of Replacement (w/o repairs) - The predicted year that the roof will have to be totally replaced if no repairs are done. This value is derived from the current age of the roof section and the RCI calculated from the visual inspection. Refer to **"ROOFER: An Engineered Management System for Bituminous Built-Up Roofs Technical Report"** for more information.

Additional Service Life (w/repairs) - The additional years of roof section life to be realized by repairing the "medium" and "high" severity defects found in the visual and insulation inspection. For more information, refer to **"ROOFER: An Engineered Management System for Bituminous Built-Up Roofs Technical Report"**.

MR&R Analysis (Cont.)

Predicted Year of Replacement (w/ repairs) - The predicted year that the roof will have to be totally replaced if repairs are done. This value is derived from the current age of the roof section and the RCI is calculated from the visual inspection.

Cost for Repair - The cost of repairing the "medium" and "high" severity defects found in the visual and insulation inspection. Total cost and cost per year are both calculated. Cost per year is derived from dividing the total cost by the additional service life.

Cost for Replacement - The cost of replacing the roofing system for the roof section. Total cost and cost per year are both calculated. Cost per year is derived from dividing the total cost by 20 - the expected life of a roofing system (in years).

Current ICI, FCI, MCI/SCI, RCI - The current Insulation (ICI), Flashing (FCI), Membrane (MCI)/Shingle (SCI), and Roof (RCI) Condition Indexes as calculated from the visual inspection data.

Improved ICI, FCI, MCI/SCI, RCI - The improved Insulation (ICI), Flashing (FCI), Membrane (MCI)/ Shingle (SCI), and Roof (RCI) Condition Index values if the "medium" and "high" severity defects found in the visual inspection are repaired (eliminated) and all wet insulation is replaced.

Adjusted Repair/Replacement Ratio - The ratio of cost of repairs per year of additional service life to the cost of the replacement per year of expected service life. Based on the value of the ratio, one of the following recommendations is made:

< 0.8	Repair
0.8 - 1.0	Marginal
> 1.2	Replace

If the ratio falls in the marginal range, other factors and monetary constraints should be used to determine whether to repair or replace the roof.

MR&R Analysis (Cont.)

Area Cost Index - The multiplier used to manipulate a base cost higher or lower. Allows modification of costs incurred locally for roofing repair. The repair costs used for the program are based on costs for the Washington, D.C., area. These costs will be updated periodically when needed by the Micro ROOFER for Windows distributing agency. Army installations should use the Location Adjustment Factor found in AR 415-17 as the ACI for their installation.

Roof Replacement Cost - The cost per square foot to completely tear off and replace the roof section.

Insulation Replacement Cost - The cost per square foot to completely replace the areas of wet insulation and overlying membrane for a roof section.

Visual Inspection Date - The date of the latest visual inspection for the roof section.

Insulation Inspection Date - The date of the latest insulation inspection for the roof section.

MR&R Analysis (Cont.)

From this screen users may choose to generate the corrective action report(s) for:
- repair report
- replacement report
- both repair and replacement reports.

After selecting a report, Micro ROOFER for Windows will prompt users to choose either a printer or a file for output.
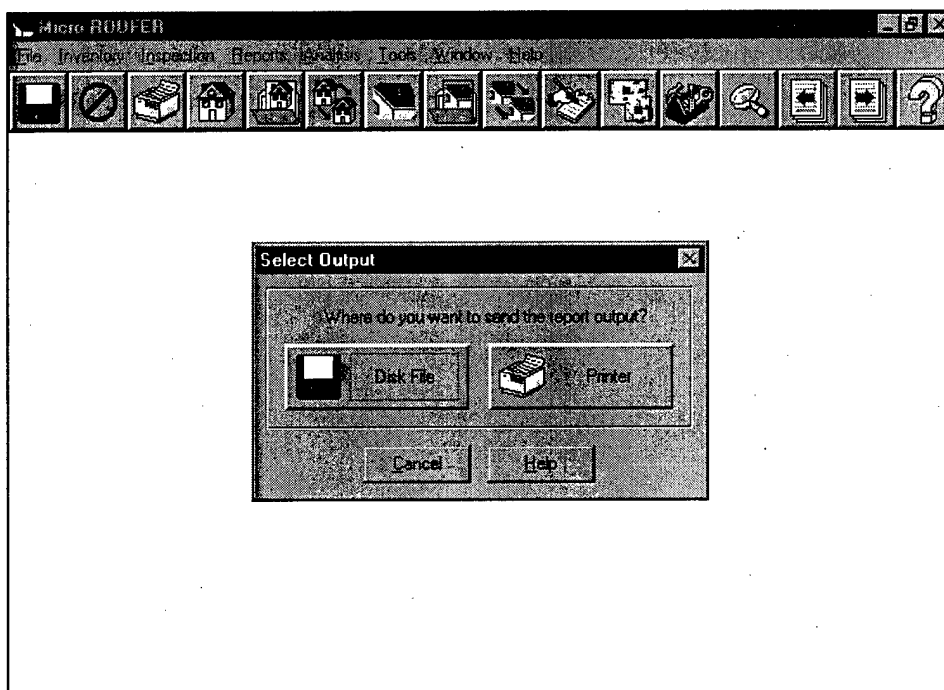
MR&R Analysis (Cont.)

If a disk file is selected, Micro ROOFER for Windows will prompt the user for the destination drive and name of the file as follows:
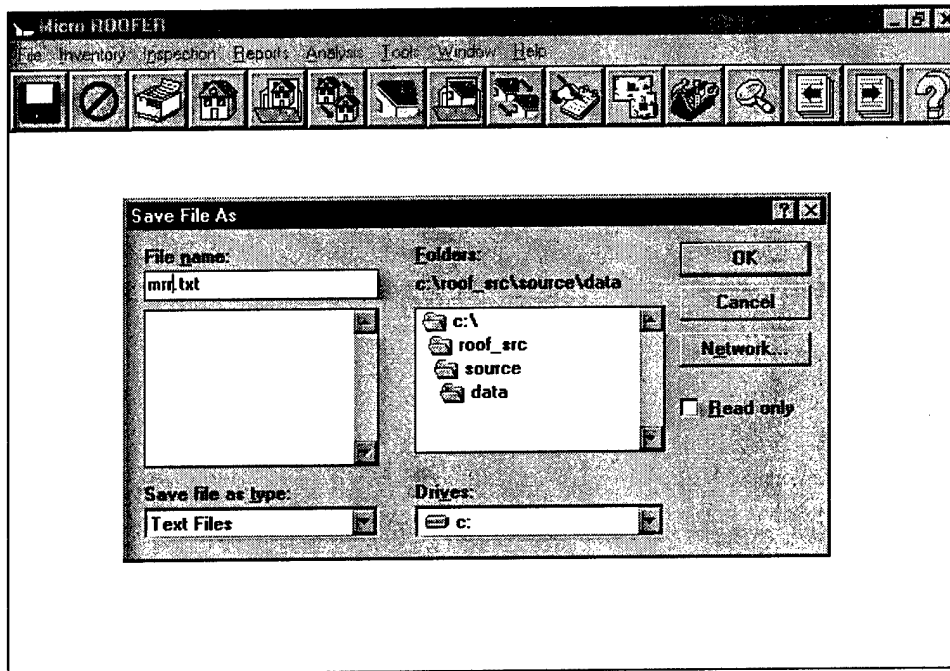
MR&R Analysis (Cont.)

If the report is sent to a printer, the message **Generating Report** will appear on the screen. At this point you may cancel the printout generation by selecting the **<Cancel>** button.

The MR&R Analysis report contains information related to the corrective action requirements depending on whether a replacement or repair project has been selected.

MR&R Analysis (Cont.)

Selecting this option will allow you to gather analysis information for a group of
buildings within your installation and summarize the results.

The following options are available for criterion selection and sorting:

Element	All	List	Range	Relational	Sortable
Condition Index	X	X	X	X	By RCI
Building ID	X	X	X	X	X
Facility Class	X	X			X
Roof Type	X	X			X
Section Area	X	X	X	X	X
Last Construction Year	X	X	X	X	X
Last Inspection Year	X	X	X	X	X
Replace Year / No Repairs	X	X	X	X	X
Replace Year / Repairs	X	X	X	X	X
Repair / Replace Ratio	X	X	X	X	X

Ten-Year Budget Plan

The Ten-Year Budget Plan provides a schedule of expected budget requirements for the entire database or portion of the database to accomplish temporary repairs, major repair project roof replacements, and inspections. The **Enter Starting Year and Cost Values** allows the user to vary the start date for the report and cost values by category to obtain projected information.
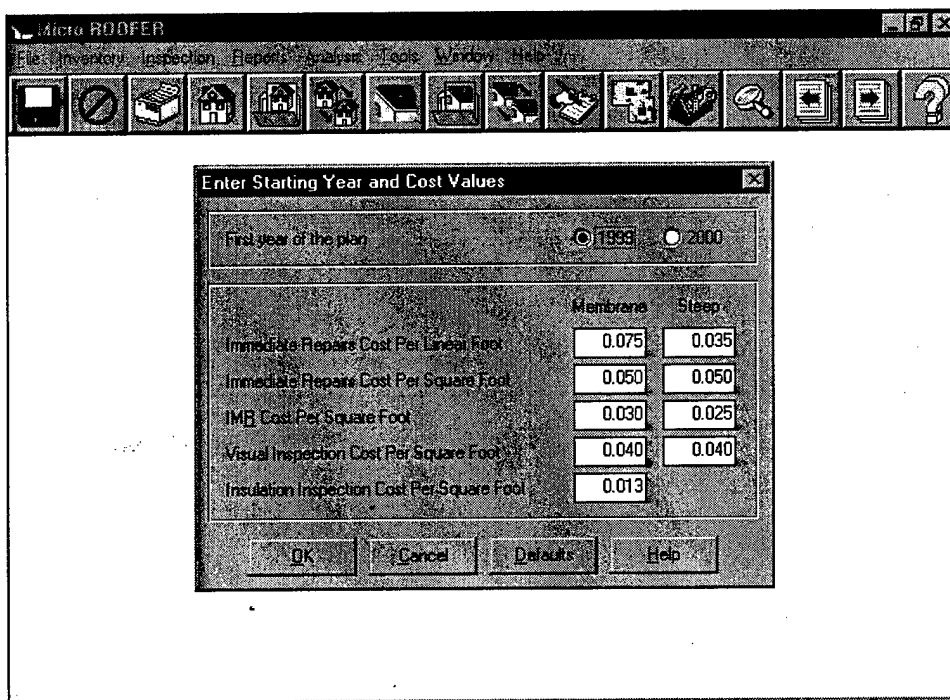
Ten-Year Budget Plan (Cont.)

The following terms can be found on the **Ten-Year Budget Plan.**

Number of Buildings: The number of buildings contained in the report.

Number of Sections: The number of sections contained in the report.

Total Section Area: The total area of roof sections contained in the report.

Roof Moisture Scan
  Start Year: The starting year for the moisture survey inspections.
  Interval: The time interval between moisture survey inspections.

Visual Inspections
  Start Year: The starting year of visual inspections.
  Interval: The time interval between visual inspections for each roof section.
  Spread: The spread of time for visual inspections to be conducted for the roof
network.

Major Repair Costs: All needed repairs, breakdown by year.

Ten-Year Budget Plan (Cont.)

Based on the data and selection criteria entered, a ten-year budget plan is produced.
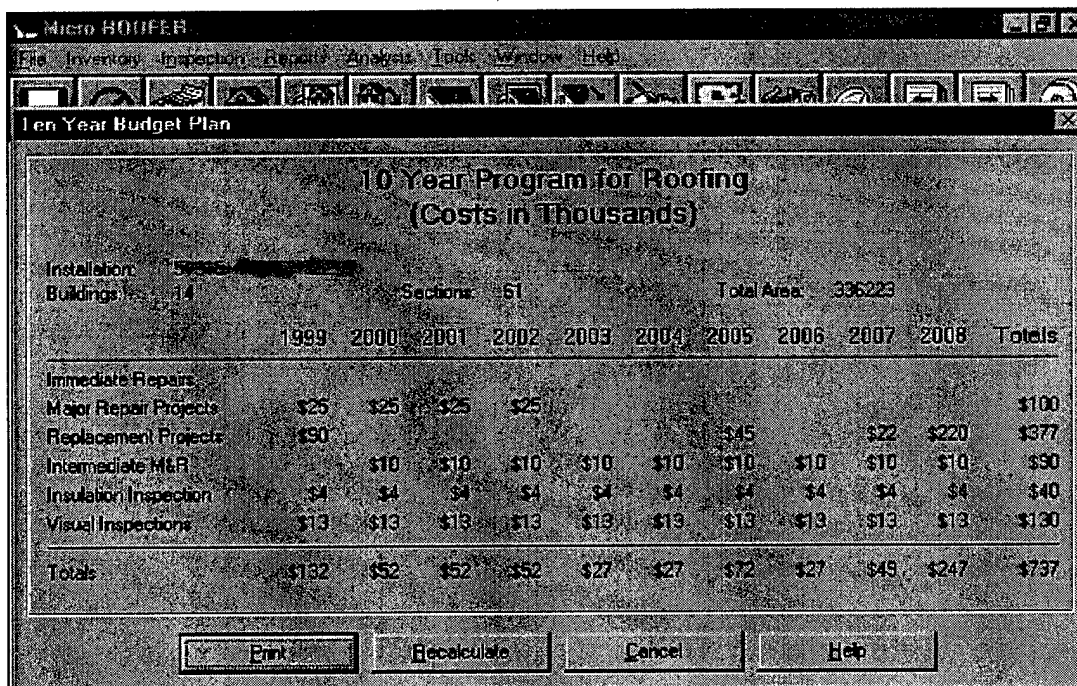
The report can be printed to hard copy by selecting the **Print** button.

Distress Analysis

This report will provide a breakdown of the distresses found within the database.

The following options are available for criterion selection and sorting:

Element	All	List	Range	Relational	Sortable
Condition Index	X	X	X	X	By RCI
Building ID	X	X	X	X	X
Facility Class	X	X			X
Roof Type	X	X			X
Insulation Type	X	X			
Deck Type	X	X			X
Roof Slope	X	X			X
Section Area	X	X	X	X	X
Last Construction Year	X	X	X	X	X
Last Inspection Year	X	X	X	X	X

The report summarizes total quantities of distress types and the repair costs for all roof sections included in the report.

Edit Cost Values

The **Edit Cost Profiles** option gives the user the ability to change the repair and re-placement cost values as defined by the system. The three profile attributes that can be changed are the ACI (for repairs of medium and high severity defects), Roof Replacement Cost, and the Insulation Replacement Cost.

To use this function, select a profile to add, edit, or delete. Clicking the **Add** or **Edit** button will result a new record or existing record being brought up in an editable format. The user cannot edit or delete the default replacement cost value profile. After making changes click the **<OK>** button to leave this form.

The following terms can be found on the **Edit Cost Profiles** form:

Area Cost Index: The value used to identify the sites location cost index, that glob-ally affects the defect repair costs.

Steep Roof Replacement Cost: The value used to identify the steep roof replacement cost (per square feet).

Membrane Roof Replacement Cost: The value used to identify the membrane re-placement cost (per square feet).

Insulation Replacement Cost: The value of the insulation replacement cost (for membrane roofing systems).

Repair Setup Charge: The value of the repair setup charges.

7 Database Tools

Introduction

The Micro ROOFER for Windows menu bar offers user access to the following features:

- recalculate indexes
- import DOS database
- merge database
- copy database
- delete database
- compact database
- repair database

Some file menu options are only available when no database is open.
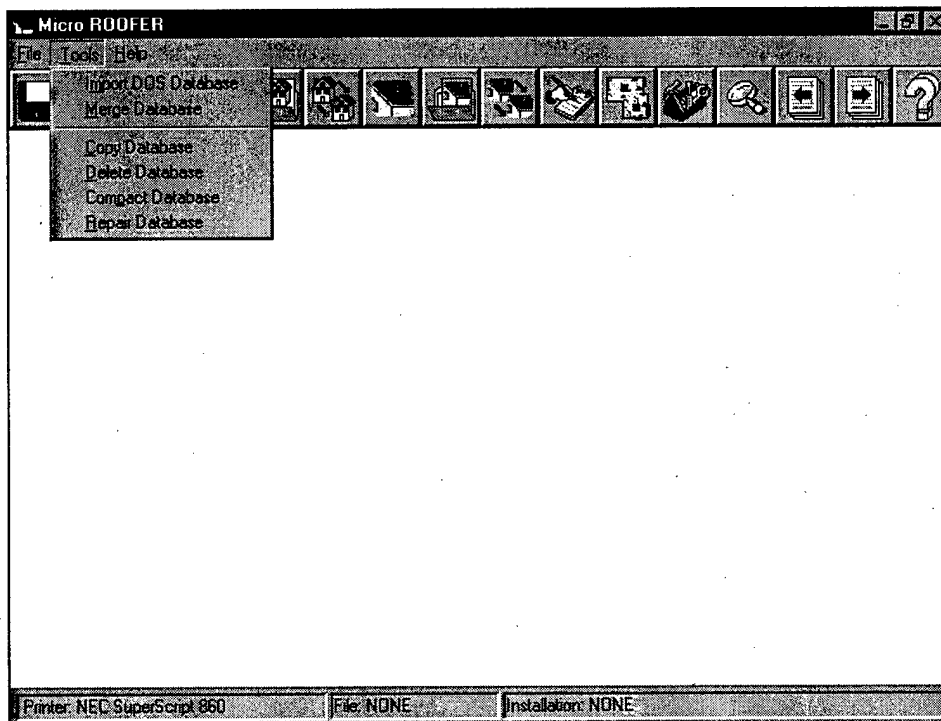
Recalculating Indexes

This option allows for recalculation of the condition indexes stored in the ROOFER database tables. This function should be performed if a database was manipulated externally or fixed after being corrupted.
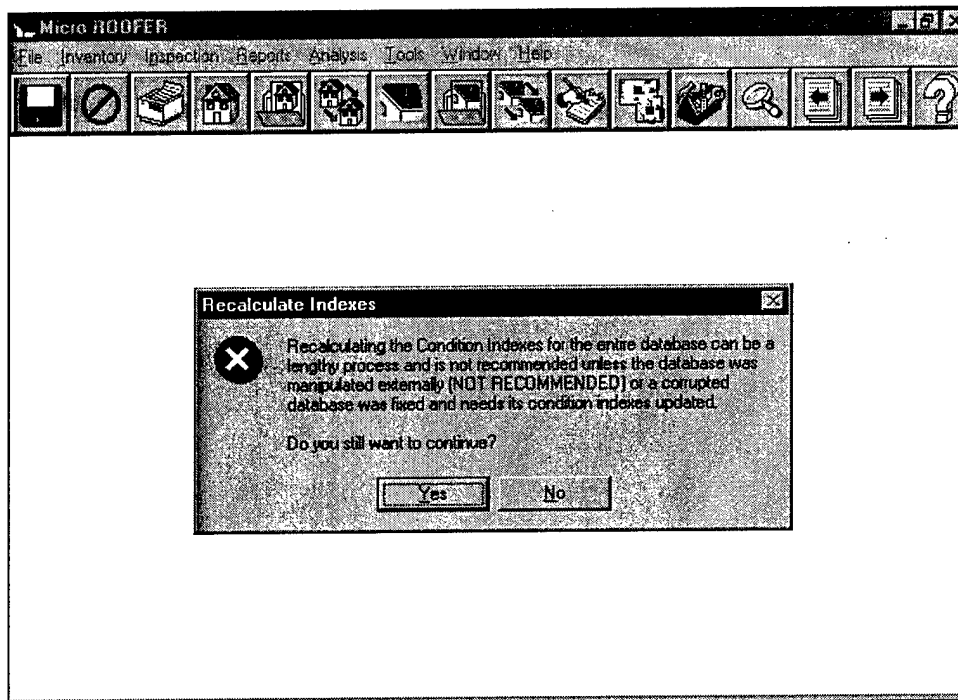
Import DOS Database

This option should only be used when a user needs to convert ROOFER for DOS version 2.0 into Micro ROOFER for Windows version 1.0 format. By using the **Select Micro ROOFER for DOS Database** dialog box, the user can select a DOS database to import. Once the selection is made, the Micro ROOFER for Windows program will prompt the user to enter the directory path of the Micro ROOFER for Windows version 1.0 files.

NOTE: This function only needs to be performed once for each ROOFER for DOS database.

WARNING: To ensure proper data importation, please run the **Reorganize Database** option under the **Database Administration** menu in your Micro ROOFER for DOS program before attempting the import process. This should be done once for each database imported.
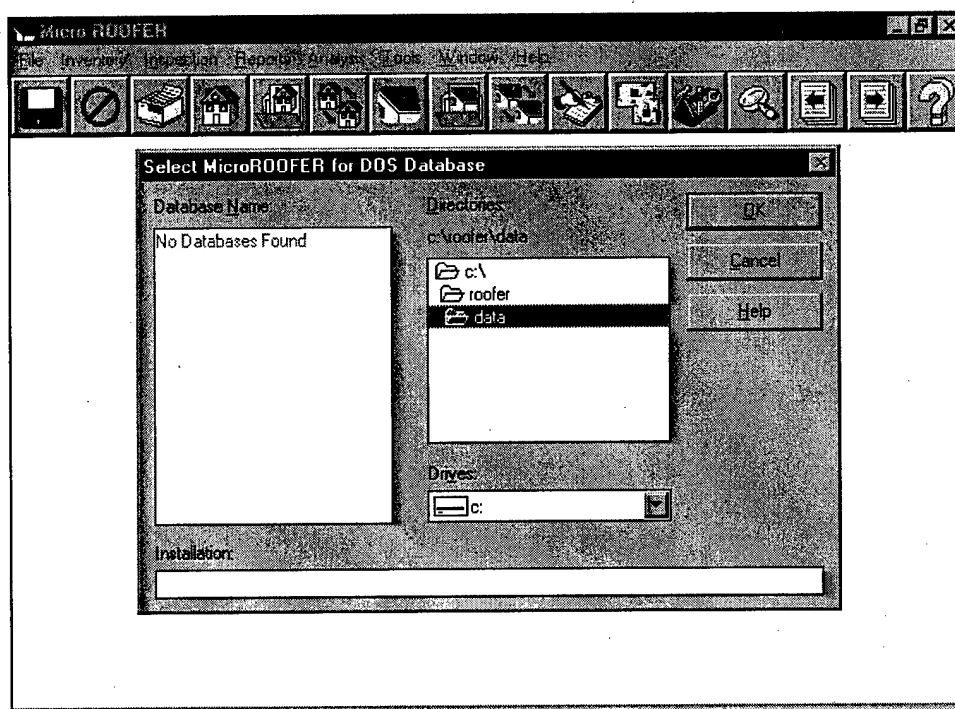
Merge Database

This option should be used to merge two separate ROOFER databases into one. By using the **Merge Database** dialog box, the user can select a source database to add to the database currently open.
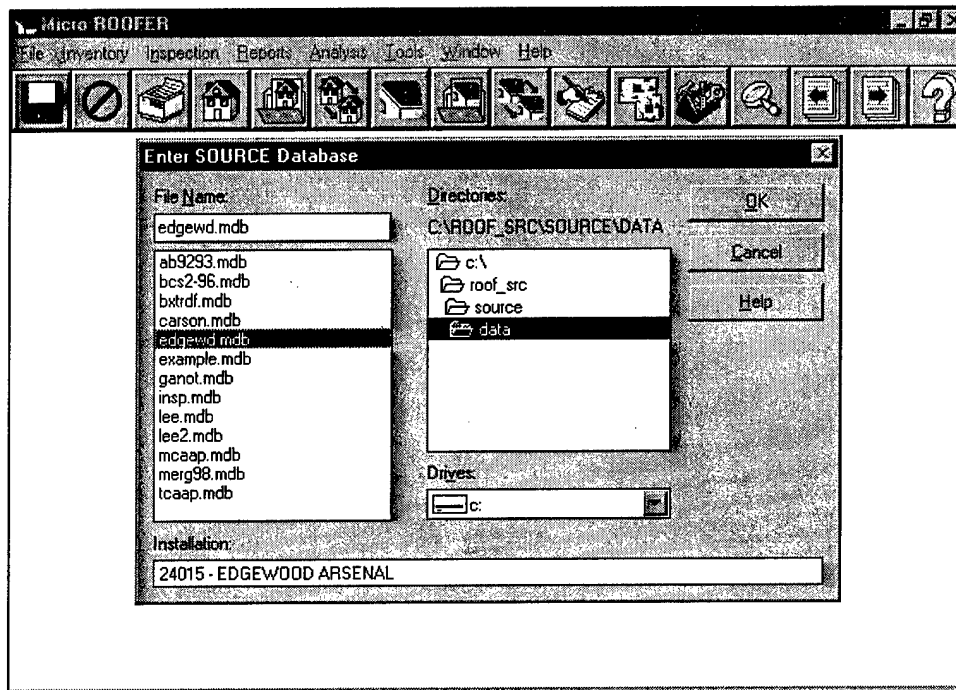
Merge Database (Cont.)

Once the source and destination databases are identified, the user can select specific buildings to add to the destination database. Either all buildings or individual buildings can be selected and added to the destination database.
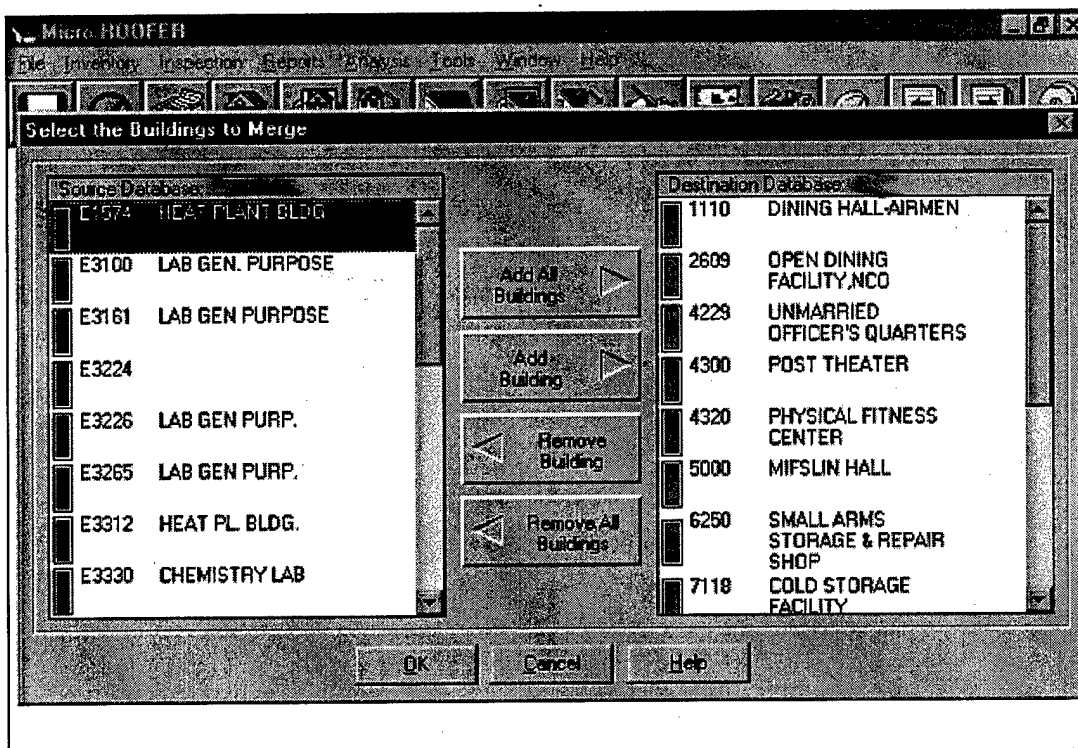
After the buildings to merge are selected, pressing the **<OK>** button will merge the source database information to the destination database.

Copying Databases

This selection enables Micro ROOFER for Windows users to make duplicate copies of the Micro ROOFER for Windows database files. These duplicate databases may be used for backup of current work or to make a copy of database files for other uses. To make a copy of a database use the **Enter Data Source** dialog box to select a database to copy. Once a database has been selected, click the **<OK>** button. The **Enter Destination Database** dialog box will appear. Choose a new database and click the **<OK>** button. The database selected as the source will be copied to the database identified as the destination.
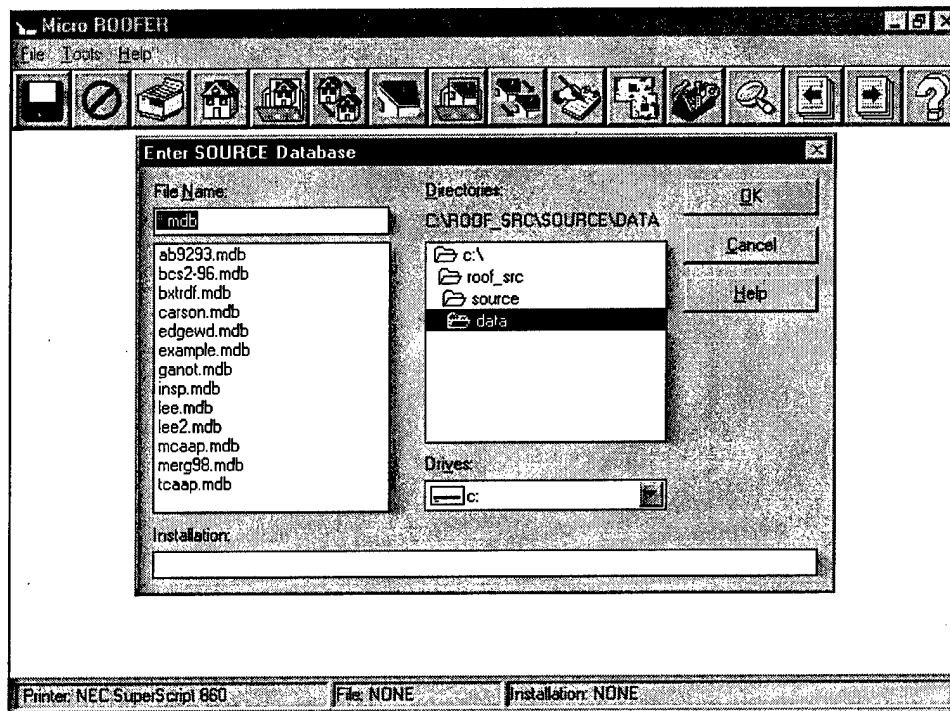
Deleting Databases

This selection enables Micro ROOFER for Windows users to delete entire Micro ROOFER for Windows database files. To delete an existing database, select the **Delete Database** option from the **File** main menu option. The **Enter Database to Delete** dialog will prompt the user to select a database to delete. After pressing the <**OK**> button, a confirmation dialog will verify that the user wants to delete the selected database. Choosing <**Yes**> to the confirmation will delete the database.
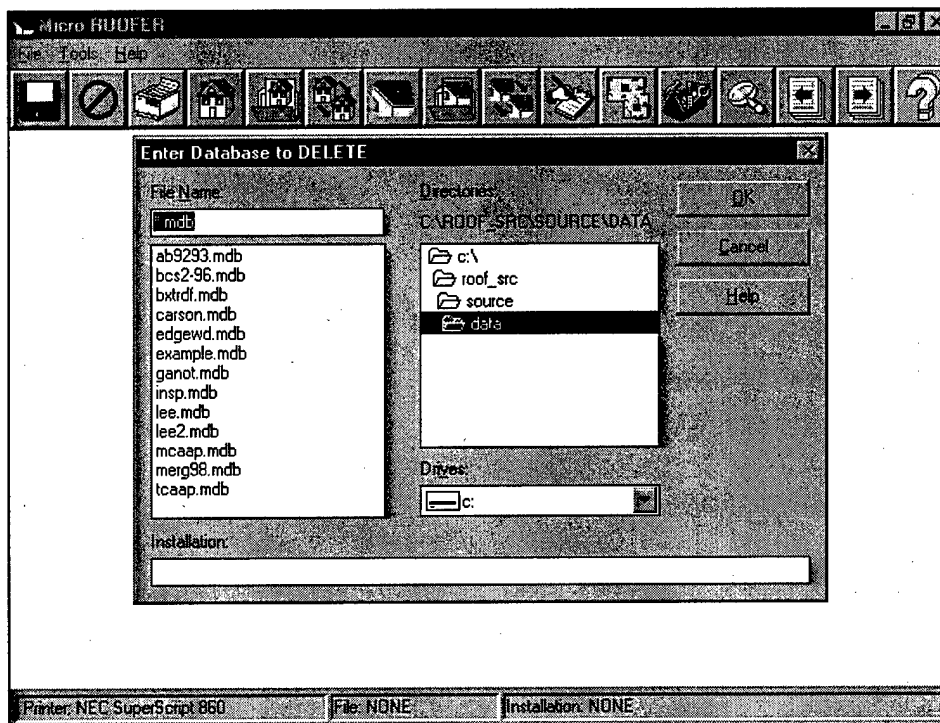
Compacting Databases

This selection will compress all unused space in the Micro ROOFER for Windows database structure. Users should run this routine after frequent updates and/or deletions are performed in the Micro ROOFER for Windows database or after other extensive data manipulation has been done.
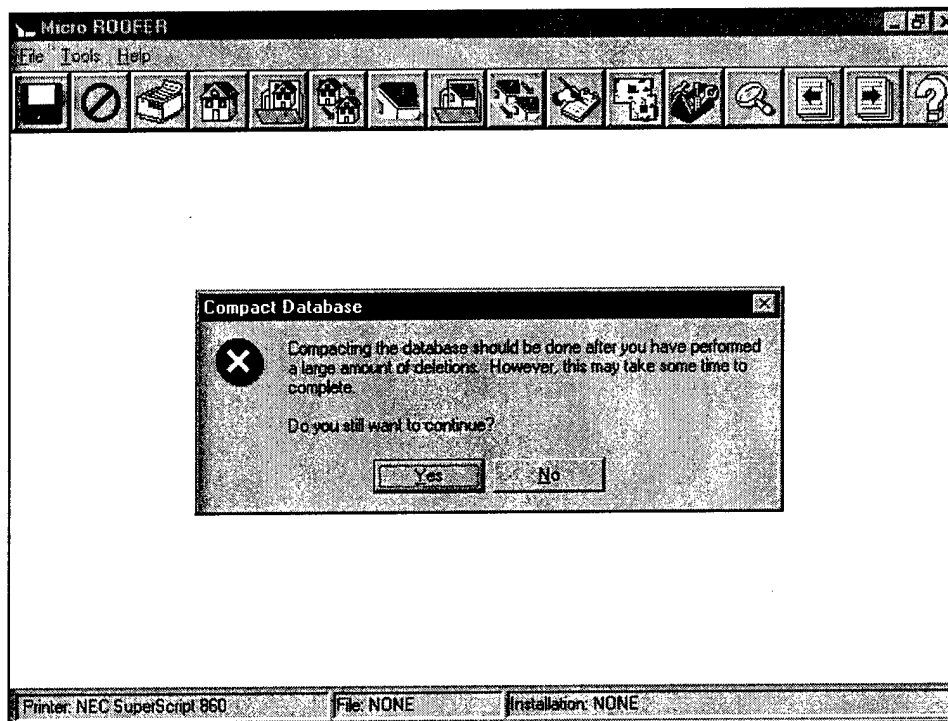
Repairing Damaged Databases

This selection will attempt to correct errors in a damaged Micro ROOFER for Windows database file. If an error is reported when accessing the Micro ROOFER for Windows database, this option should be used. If Micro ROOFER for Windows is unable to fix a damaged Micro ROOFER for Windows file, the database will need to be restored from the backup copy.

NOTE: This is not a failsafe procedure. It is very important that good backups of Micro ROOFER for Windows database files are maintained.
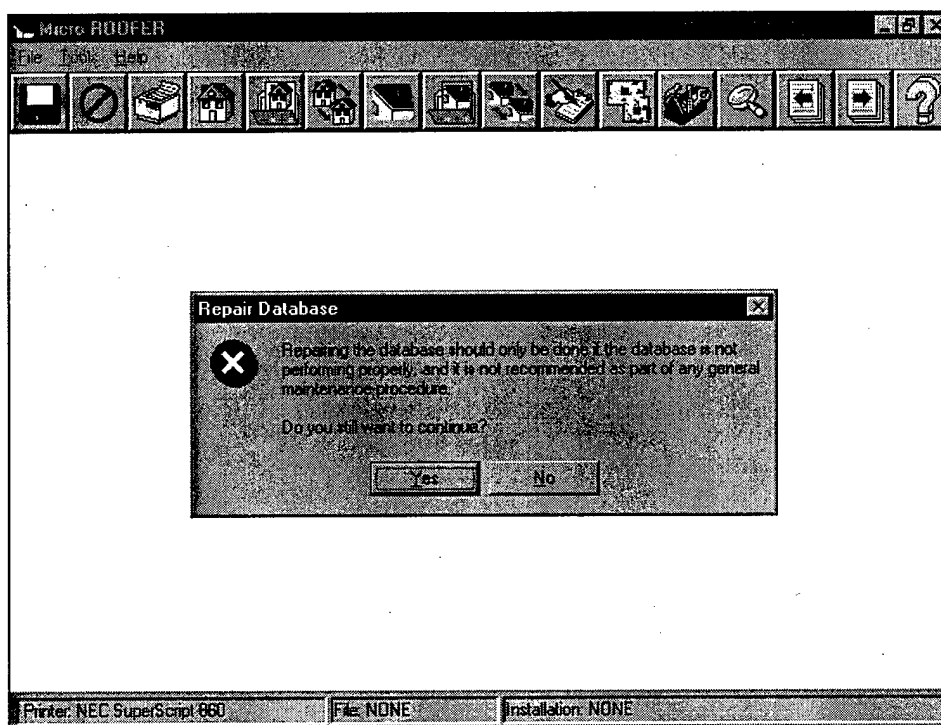
REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

1. REPORT DATE (DD-MM-YYYY)	2. REPORT TYPE	3. DATES COVERED (From - To)
August 2003	Final	

4. TITLE AND SUBTITLE
Micro ROOFER for Windows User Guide Version 2.0

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)
David Bailey

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. Army Engineer Research and Development Center (ERDC)
Construction Engineering Research Laboratory (CERL)
PO Box 9005
Champaign, IL 61826-9005

8. PERFORMING ORGANIZATION REPORT NUMBER
ERDC/CERL SR-03-8

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Headquarters, U.S. Army Corps of Engineers
441 G Street NW
Washington, DC 20314-1000

10. SPONSOR/MONITOR'S ACRONYM(S)
CEMP-IS

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited.

13. SUPPLEMENTARY NOTES
Copies are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

14. ABSTRACT

ROOFER is an engineered management system (EMS) designed to provide organizational facilities for the management of bituminous built-up, single-ply and asphalt shingle roofing systems. Micro ROOFER, the software embodiment of ROOFER EMS, was a fielded product that operated on PC compatible computers running MS-DOS.

Micro ROOFER was developed as a computer version of ROOFER EMS. The program provides engineers with data and procedures to aid in practical decision making for cost-effective maintenance and repair of building roofs. The program was modified to include management of the steep roofing systems inventory and the condition assessment of asphalt shingle roofs.

Micro ROOFER For Windows provides the user with many important capabilities, including: data storage and retrieval; database administration; windows ease of use and functionality; determination of membrane, flashing, insulation, and overall roof condition ratings; determination of optimal maintenance, repair, and replacement strategies; report generation for network; and project level management.

The objective of this report is to provide operating instructions to users of the Micro ROOFER for Windows software database program.

15. SUBJECT TERMS
ROOFER computer program, maintenenace and repair, user guide, roofing systems, engineered management system (EMS), life cycle costs

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**	SAR	110	David M. Bailey
Unclassified	Unclassified	Unclassified			**19b. TELEPHONE NUMBER (include area code)** 217.352-6511 ext 7480

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. 239.18